

APPENDIX



Fluid connectors, solid solutions



HOSES

LEGEND OF SYMBOLS



Inside Diameter (I.D.)

内径 (I.D.)
Innendurchmesser (I.D.)
Diametro interno (I.D.)



Outside Diameter (O.D.)

外径 (O.D.)
Außendurchmesser (O.D.)
Diametro esterno (O.D.)



Minimum bend radius

最小弯曲半径
Mindest Biegeradius
Minimo raggio di curvatura



Reinforcement Outside Diameter (R.O.D.)

增强层外径 (R.O.D.)
Außendurchmesser Druckträger (R.O.D.)
Diametro esterno rinforzo (R.O.D.)



Maximum working pressure

最大工作压力
max. Betriebsdruck
Pressione massima di esercizio



Ferrule / Socket

套筒 / 插口
Fassung
Ghiera



Burst pressure: it is the minimum guaranteed burst pressure of the hose, equivalent or superior to the reference specifications minimum requirements.

爆破压力: 软管保证的最小爆破压力, 等于或优于最小要求参考规范。
Berstdruck: Ist der garantierte Mindestberstdruck Erreicht oder übertrifft die jeweiligen Spezifikationsmindest-Anforderungen
Pressione di scoppio: è la minima pressione di scoppio garantita, equivalente o superiore alla pressione di scoppio richiesta dalle norme di riferimento del tubo.



Weight

重量
Gewicht
Peso



Insert

插头
Nippel
Inserto
MF MF2000® Multifit type
IP MF2000® Interlock Plus type
XL MF2000® Xtralock type
BL MF2000® Blastlock type
PL MF2000® Push-Lock type



Refrimaster clamp

Refrimaster 管夹
Refrimaster Doppelklemme
Fascetta Refrimaster



Refrimasterplus clamp

Refrimasterplus 管夹
Refrimasterplus Doppelklemme
Fascetta Refrimasterplus



Refrimaster ferrule

Refrimaster 套筒
Refrimaster Fassung
Boccola Refrimaster



Refrimasterplus ferrule

Refrimasterplus 套筒
Refrimasterplus Fassung
Boccola Refrimasterplus



Crimp ferrule for Refrimasterplus

Refrimasterplus 扣压套筒
Pressfassung für Refrimasterplus
Boccola pressata per Refrimasterplus



Reusable ferrule for Refristar

Refristar 可循环使用套筒
Wiederverwendbare Schraubfassung für Refristar
Boccola recuperabile per Refristar



One piece fitting for Refrifast

Refrifast 一体式接头
Einteilige Armatur für Refrifast
Raccordo one-piece per Refristar



Working Pressure: It is the maximum pressure at which the correct functioning of the quick coupling is assured. Working pressure is assured both in connected and disconnected conditions.
工作压力: 可确保快速接头正常使用的最高压力。
在连接和断开条件下可确保达到的工作压力。

Arbeitsdruck: Maximaldruck bei dem die korrekte Funktion der Kupplung gewährleistet ist. Der Arbeitsdruck wird sowohl im gekoppelten wie auch im getrennten Zustand gewährleistet.

Maximum Working Pressure: È la pressione massima di esercizio alla quale è garantito il corretto funzionamento dell'innesto rapido. La pressione massima di esercizio è garantita sia in condizione connessa che disconnessa.



Flow Rate: It is the fluid quantity which passes through a cross section of the quick coupling in the time unit.

流量: 单位时间内通过快速接头横截面的流量。
Volumenstrom: Flüssigkeitsmenge die in einer Zeiteinheit (Minute) den Querschnitt der Kupplung durchströmt.

Flow Rate: È la quantità di fluido che attraversa una sezione dell'innesto rapido nell'unità di tempo



Connection Effort: It is the effort required to lock the male insert into the female one.

连接操作力: 将阳端插头锁入阴端所需的操作力。

Anschließkraft: Kraft die benötigt wird den Stecker mit der Muffe zu verbinden.

Connection Effort: È la forza necessaria per agganciare l'innesto parte maschio e l'innesto parte femmina.



Oil Spillage: It is the fluid quantity lost from the coupling during the connection/disconnection phase.

漏油量:

连接/断开操作期间从耦合接头泄漏的液体量。

Ölverlust: Flüssigkeitsmenge die während des Verbindens/Trennens der Kupplung verloren geht.

Oil Spillage: È la quantità di olio che fuoriesce durante una fase di connessione e disconnessione.



Connection/Disconnection under pressure: It is the possibility to connect and disconnect with pressure inside the quick coupling.

带压连接/断开:

是否能够在快速接头内部存在压力的情况下进行连接和断开。

Verbinden/Trennen unter Druck: Möglichkeit die Kupplung zu verbinden oder zu trennen auch wenn in der Leitung unter Druck steht.

Connection/Disconnection under pressure: È la possibilità di connettere o disconnettere l'innesto rapido in presenza di pressione all'interno di esso.

Continuous service: refers to the working temperature range.

连续工作: 指工作温度范围。

Betriebstemperatur: beschreibt die Dauerbetriebstemperatur.

Servizio continuo: relativo alla temperatura di esercizio.

Max operating temperature (Intermittent service):

peaks of temperature of short duration and total cumulative duration lower than 5% of the total service life.

最大工作温度 (间歇工作): 短暂峰值温度,

累积时间不超过总工作时间的 5%。

Maximale Betriebstemperatur: Maximale Spitztemperatur nur für kurze Zeit. (Weniger als 5% der vorgesehenen Einsatzdauer).

Massima temperatura operativa (servizio intermittente):

picchi di temperatura di durata limitata e cumulativa inferiore al 5% della totale durata di esercizio.

Recommended fluids: fluid types that the hose can convey with excellent / good chemical compatibility.

推荐使用流体:

胶管可以优越/良好的化学兼容性输送的流体类型。

Empfohlene Medien: Medien mit besonders hoher chemischer Verträglichkeit.

Fluidi raccomandati: tipi di fluido consigliati che garantiscono una ottima/buona compatibilità chimica con il tubo.

Hose service life: cumulative duration of time in which the hose is under operative conditions.

胶管工作寿命: 在工作条件下的累积工作时间。

Betriebsdauererwartung: Maximaler Betriebseinsatz bei normgerechter Anwendung.

Durata di esercizio del tubo: durata cumulativa dei periodi di tempo in cui il tubo si trova in esercizio operativo.

HOSES

LEGEND OF SYMBOLS

HOSE SIZE CORRESPONDENCE TABLE

HYDRAULICS			
HOSE SIZE			
DN	dash	mm	inch
5	- 03	4,8	3/16"
6	- 04	6,4	1/4"
8	- 05	7,9	5/16"
10	- 06	9,5	3/8"
12	- 08	12,7	1/2"
16	- 10	16,0	5/8"
19	- 12	19,0	3/4"
25	- 16	25,4	1"
31	- 20	31,8	1.1/4"
38	- 24	38,1	1.1/2"
51	- 32	50,8	2"
60	- 38	60,3	2.3/8"
63	- 40	63,5	2.1/2"
76	- 48	76,2	3"
89	- 56	88,9	3.1/2"
102	- 64	101,6	4"

REFRIGERATION				
HOSE SIZE				Hydraulics inch reference (*)
DN	dash	mm	inch	
5	- 04	4,8	3/16"	1/4"
8	- 06	7,9	5/16"	3/8"
10	- 08	10,3	13/32"	1/2"
(12) 13	- 10	12,7	1/2"	5/8"
16	- 12	15,9	5/8"	3/4"
22	- 16	22,2	7/8"	1"
28	- 20	28,6	1.1/8"	1.1/4"
35	- 24	34,9	1.3/8"	1.1/2"

(*) different correspondence DN-dash between Hydraulics and Refrigeration. Refer to the above tables for the correct correspondence.

HOSES - FLUID COMPATIBILITY CHART

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WARNING: This chemical compatibility guide must not be used in conjunction with any other compatibility guides from previous or future catalogue editions, bulletins or publications. Incorrect use of these charts could result in personal injury or property damage.

HOSE SELECTION BY MEDIUM AND HOSE TYPE

This hose compatibility chart is a reference of Manuli hose compatibility with various fluid media. It is intended as a guide to chemical compatibility with inner tube materials and assembly lubricants applied internally.

The Fluid Compatibility Chart lists the relative resistance of hose tube and fitting materials to more common hydraulic fluids and chemicals. These ratings do not cover all possible variations of all factors, such as temperature, concentration, degradation or fluid contamination, etc. Testing under actual conditions is the best way to assure chemical compatibility for critical applications.

The specific recommendations regarding **hydraulic fluids** are based upon specific laboratory tests with fluids and/or field experiences, the advice of various polymer or fluid suppliers. It must be stressed, however, that this information is offered only as a guide. Final hose selection depends also upon pressure, fluid temperature, ambient temperature, and special requirements or variations, which may not be known by Manuli.

All the combined factors in working operations may impact on the service life of the hose assembly and must be carefully considered before release a hose for a specific application: the chemical compatibility with the service fluid is only one of the factors to be considered.

The specific recommendations regarding **generic chemicals** are mainly based on literature data in conjunction with polymers used for the tube compound. The field results of the fluid conveyed in the hose should be carefully tested and field validated by users.

No tests on finished hose assemblies in combination with the mentioned chemicals has been normally performed. Manuli hoses are designed for hydraulics, they are not intended for industrial diversified applications with various chemicals.

The outer cover of the hose is intended to protect the reinforcement layer(s) from mechanical influences (abrasion, weathering etc), cover compounds are not designed to exhibit the same chemical resistance as the tube compounds. Manuli Rubber Industries should be consulted about the compatibility of the cover, should the application involve the extended exposure or immersion in a liquid: anyway the hydraulic hoses of the Manuli product range are not designed in general for immersion in the service fluid. This type of special applications should be avoided or carefully studied with additional external protections for the hoses, selection of special hose types, e.g. with thermoplastic cover and validation on the specific application. The turbulence of the fluid, the high temperature and nature of the fluid as well as other elements may impact the properties or integrity of the hose cover material (the cover compound of the hose is designed to resist to oil drops and external agents, not immersion in the service fluid).

For more detailed information contact Manuli Rubber Industries.

HOW TO USE THE CHART

- Hydraulic fluids are listed in alphabetic order with the manufacturer brand name, chemicals are listed alphabetically;
- Find the hose type and read the compatibility rating (see rating scale);
- Define the proper hose selection for the application by choosing the best rating.

LEGENDA OF RATINGS

E = Excellent - Small or negligible changes of compound properties: no problem for use. Service life can exceed the expectations.

G = Good - There are only minor changes of some compound properties. Service life is normally in line with state of the art (standard) expectations.

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C = Conditional - significant changes on some compound properties. Service life can be reduced; higher durability can be achieved with reduced severity of working conditions (temperature in particular) or with an upgraded hose selection. Whenever possible, a field validation under actual working conditions is recommended.

X = Not recommended - Unsuitable, severe effects on physical properties.

REMARKS:

- O-Rings used with couplings also must be considered for chemical compatibility with the fluid to be conveyed. This includes fittings containing internal O-Rings; for example Metric Female 24° Cone seat fittings, etc. Standard O-Ring of Manuli fittings are made of Nitrile rubber (NBR), highly chemically compatible with all hydraulic fluids. If you use special fluids or very high temperatures, different O-Ring materials should be used, contact Manuli Rubber Industries for specific information. See Technical Manual for dimensions of O-Rings.
- Compatibility of hose fittings with conveyed fluids is an essential factor in avoiding chemical reactions that may result in release of fluids and failure of the connection with the potential of causing severe personal injury or property damage. Standard Manuli fittings are made of carbon steel with Hexavalent chromium free plating.

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警告: 本化学相容性指南不得与其他任何产品目录、公告或出版物的相容性指南结合使用。如果不正确使用这些表格, 可能导致人员伤害或者财产损失。

按照介质和软管类型选择软管

本软管相容性表用于为玛努利软管与各种不同流体介质的相容性提供参考。
可作为管内材料与内部使用的总成润滑剂之间的化学相容性指南。

流体相容性表列出了软管及接头材料对常见液压液体与化学品的相对耐受性。这些数据并不包括所有变化因素, 例如温度、浓度、性能下降或者流体污染等等。在实际条件下进行测试是在关键应用中确保化学相容性的最佳方法。

关于液压液体的具体建议均源自相关流体的特定实验室试验及/或现场应用经验, 以及各种不同聚合物或者液体供应商的建议。但必须强调, 该信息仅供参考。最终软管选择还取决于压力、流体温度、环境温度以及玛努利无法预知的特殊要求或者变化因素。

工作过程中的所有综合因素可能影响软管总成的使用寿命, 在实际应用之前必须仔细考虑: 与工作液体之间的化学相容性只是考虑因素之一。

关于一般化学品的具体建议主要源自软管用聚合物相关的文献数据。
用户应仔细执行软管的现场流体输送测试和现场验证。
目前尚未对软管总成及所述化学品进行正式的组合使用测试。
玛努利软管用于液压系统, 不可用于其他使用各种不同化学品的工业应用场合。

软管的外层用于保护增强层免受物理影响 (摩擦、气候等等), 外层材料的耐化学性可能与管内材料不同。如果在实际应用中可能与液体长时间接触或者浸入液体, 应向玛努利橡胶工业公司咨询外层材料的相容性: 总之, 玛努利产品系列的液压软管并非设计为可浸入工作流体。应该避免这种特殊应用, 应对软管的外部防护, 特殊类型软管的选择如热塑层和特殊应用的验证等, 加以认真研究。流体的紊乱, 高温, 流体的性质及其他因素可能会影响软管外层材料的性能或对其造成损害 (软管外层复合物旨在防油滴和外部介质, 而非浸入辅助流体)。
详细信息, 请与玛努利橡胶工业公司联系。

如何使用该表

- 液压流体按照生产商的品牌名称字母表顺序排列, 化学品按照字母表顺序排列;
- 查找软管类型和阅读相容性等级 (参见等级定义);
- 通过选择最佳等级, 为具体应用选择适当的软管。

等级图例

E = 优秀 - 复合物性能微小改变或其改变可忽略不计: 可放心使用。使用寿命可能超过预期。
G = 良好 - 复合物性能只有轻微改变。使用寿命通常与最新 (标准) 预期相符。
C = 视情况而定 - 一些复合物性能有重大改变。使用寿命可能缩短; 可通过降低工作条件 (特别是温度) 或者选择更高的软管等级来提高耐用性。建议尽可能在实际工作条件下进行现场验证。

X = 不推荐 - 不适合, 对物理属性存在严重影响。

备注:

- 还必须考虑耦合接头上的O型圈与被输送流体之间的化学相容性。这包括包含内部O型圈的接头; 例如公制内螺纹24°锥形底座接头等等。玛努利接头的标准O型圈由丁腈橡胶 (NBR) 制成, 对于所有液压流体都具有较高的化学兼容性。如果使用特殊流体或者温度非常高, 应使用不同的O型圈材料, 具体信息请联系玛努利橡胶工业公司。关于O型圈的尺寸, 请参见技术手册。

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- 为了避免发生化学反应 (可能导致流体泄漏和连接失效) 以及可能导致的严重人员伤害或者财产损失, 软管接头与输送流体的兼容性是一个关键因素。标准玛努利接头由碳钢制成, 经电镀处理 (无六价铬)。

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WARNUNG: Diese Anleitung für chemische Kompatibilität darf nicht in Verbindung mit anderen Kompatibilitätsanleitungen älterer oder zukünftiger Katalogausgaben, Bekanntmachungsblätter oder Veröffentlichungen verwendet werden. Die fehlerhafte Verwendung dieser Tabellen kann Verletzungen von Personen oder Sachschäden zur Folge haben.

AUSWAHL NACH SCHLAUCHTYP UND FLÜSSIGKEIT

Diese Schlauchkompatibilitätstabelle dient als Referenz für die Kompatibilität von Manuli-Schläuchen mit den unterschiedlichen Flüssigkeiten. Sie ist als Anleitung für die chemische Kompatibilität der Innenseite und der intern verwendeten Schmiermittel für den Zusammenbau zu verstehen.

Die Flüssigkeitskompatibilitätstabelle führt die relative Widerstandsfähigkeit des Schlauches und der Anschlussmaterialien gegen die am häufigsten eingesetzten Hydraulikflüssigkeiten und Chemikalien auf. Diese Angaben können nicht alle Variationsmöglichkeiten der verschiedenen Faktoren wie Temperatur, Konzentration, Zersetzung oder Kontamination der Flüssigkeiten, etc. abdecken. Die beste Möglichkeit, die chemische Kompatibilität bei kritischen Anwendungen zu prüfen, ist ein Testlauf unter den tatsächlich bestehenden Umständen.

Die spezifischen Empfehlungen im Hinblick auf **Hydraulikflüssigkeiten** basieren auf spezifischen Labortests mit Flüssigkeiten und/oder Felderfahrungen sowie den Empfehlungen der Hersteller von Polymeren oder Flüssigkeiten. Wir unterstreichen allerdings die Tatsache, dass diese Information nur als Anleitung gilt. Die letztendliche Auswahl der Schläuche hängt auch von Druck, Temperatur der Flüssigkeit, Umgebungstemperatur und den speziellen Anforderungen oder Variationen, die Manuli nicht unbedingt kennt, ab.

Die Kombination all dieser Faktoren kann Einfluss auf die Lebensdauer der Schlauchleitungen haben und muss aufmerksam geprüft werden, bevor ein Schlauch für eine spezifische Anwendung gewählt wird: die chemische Kompatibilität mit der Betriebsflüssigkeit ist nur einer der zu berücksichtigenden Faktoren.

Die spezifischen Empfehlungen im Hinblick auf **allgemeine Chemikalien** gründen sich im Wesentlichen auf in der Literatur enthaltene Daten im Zusammenhang mit den Polymeren in der Schlauchverbindung. Die Felddaten der im spezifischen Schlauch geleiteten Flüssigkeiten müssen vom Nutzer sorgfältig geprüft und bewertet werden.

An fertigen Schlauchverbindungen in Kombination mit den genannten Chemikalien wurden keine Tests durchgeführt.

Manuli-Schläuche sind speziell für Hydraulikanwendungen bestimmt, sie sind nicht für verschiedene Industrieenanwendungen mit unterschiedlichen Chemikalien geeignet.

Die äußere Schlauchummantelung schützt die Verstärkung(en) vor mechanischen Einflüssen (Abrieb, Witterung, etc.) und die Materialverbindungen haben nicht die gleichen chemischen Widerstände wie die Innenschlauchverbindungen. Setzen Sie sich mit Manuli Rubber Industries in Verbindung, um die Kompatibilität der Ummantelung zu erfahren, wenn die Schläuche über längere Zeit einer Flüssigkeit ausgesetzt oder eingetaucht werden sollen: berücksichtigen Sie jedoch, dass die Produktpalette von Manuli im allgemeinen nicht dazu gedacht ist, in Betriebsflüssigkeiten eingetaucht zu werden. Eine solche Spezialanwendung sollte wenn möglich vermieden oder die Möglichkeit

zusätzlicher Außenummantelungen, spezielle Schlauchtypen, z.B. mit Thermoplastummantelung sowie Bewertung der spezifischen Anwendung sollten sorgfältig geprüft werden. Die Turbulenzen, hohe Temperaturen und Art der Flüssigkeit sowie andere Elemente können Auswirkungen auf die Eigenschaften oder die Integrität der Schlauchummantelung haben (der Materialverbund für die Ummantelung wurde entwickelt, um Öltropfen und externen Stoffen, nicht jedoch dem Eintauchen in die Betriebsflüssigkeit zu widerstehen).

Genauere Informationen erhalten Sie direkt von Manuli Rubber Industries.

VERWENDUNG DER TABELLE

- Hydraulikflüssigkeiten sind alphabetisch mit dem Markennamen des Herstellers, Chemikalien sind alphabetisch aufgelistet;
- Suchen Sie Ihren Schlauchtyp und lesen Sie die Kompatibilitätseinstufung (siehe Einstufungsskala);
- Definieren Sie die passende Schlauchauswahl für Ihre Anwendung über die beste Einstufung.

ERKLÄRUNG DER EINSTUFUNGEN

E = Exzellent - kleine oder vernachlässigbare Änderungen der Verbundmaterialeigenschaften: Problemlos einsetzbar. Lebensdauer übersteigt Erwartungen.

G = Gut - Nur kleine Änderungen einiger Verbundmaterialeigenschaften. Lebensdauer entspricht normalerweise Standarderwartungen.

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C = Bedingt - bedeutende Änderungen einiger Verbundeigenschaften. Lebensdauer kann reduziert sein; eine höhere Lebensdauer kann durch reduzierte Härte der Betriebsbedingungen (insbesondere Temperatur) oder durch die Auswahl eines höherwertigen Schlauchs erreicht werden.

Wo möglich wird ein Praxistest unter tatsächlichen Betriebsbedingungen empfohlen.

X = Nicht empfohlen - Ungeeignet, starke Auswirkungen auf physische Eigenschaften.

ANMERKUNGEN:

- Auch die O-Ringe eines Anschlusses müssen auf die chemische Kompatibilität mit der eingesetzten Flüssigkeit überprüft werden. Das gilt auch für Anschlüsse mit internen O-Ringen; zum Beispiel Metrische M-Anschlüsse konisch 24°, etc. Standard-O-Ringe der Anschlüsse von Manuli sind aus Perbunan (NBR), hochkompatibel mit allen Hydraulikflüssigkeiten. Sollten Sie spezielle Flüssigkeiten einsetzen oder mit sehr hohen Temperaturen arbeiten, dann müssen andere O-Ring-Materialien eingesetzt werden. Setzen Sie sich mit Manuli Rubber Industries in Verbindung, um spezifische Informationen zu erhalten. O-Ring-Abmessungen sind im Technischen Handbuch enthalten.
- Die Kompatibilität der Schlauchanschlüsse mit den eingesetzten Flüssigkeiten sind ein grundsätzlicher Faktor zur Vermeidung von chemischen Reaktionen, die das Austreten von Flüssigkeiten und das Versagen von Anschlüssen verursachen können, was potentiell hohe Gefahren für die Sicherheit des Personals und die Sachgegenstände birgt. Standard-Anschlüsse von Manuli sind aus Edelhartstahl mit hexavalenter, chromfreier Beschichtung.

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ATTENZIONE: La seguente guida di compatibilità chimica non deve essere utilizzata e paragonata con guide di precedenti o future edizioni di cataloghi, informazioni tecniche o altre pubblicazioni. L'uso non corretto di queste tabelle potrebbero causare danni a persone o cose.

SELEZIONE DEI TUBI ATTRAVERSO TIPO E MEZZO DEL TUBO

Questa tabella di compatibilità funge da riferimento per i tubi Manuli con vari fluidi. È concepita come una guida di compatibilità chimica con i materiali di rivestimento interno e i lubrificanti di assemblaggio applicati internamente.

La tabella di compatibilità fluidi elenca la relativa resistenza del tubo e dei materiali dei raccordi ai fluidi idraulici e chimici più comuni. Tali valori non coprono tutte le possibili varianti e i fattori contingenti, come ad esempio temperatura, concentrazione, degrado o contaminazione del fluido, ecc. Testare nelle effettive condizioni è il miglior modo per assicurare la compatibilità chimica nelle applicazioni critiche.

Le specifiche raccomandazioni riguardo i **fluidi idraulici** sono basate su specifici test di laboratorio e/o test sul campo, consigli di diversi fornitori di polimeri e fluidi. È bene rimarcare, però, che queste informazioni sono solo una guida. La selezione finale del tubo dipende anche dalla pressione, dalla temperatura del fluido e dell'ambiente, da particolari variazioni e necessità, che possono non essere note alla Manuli.

Le raccomandazioni specifiche riguardo **gli elementi chimici** generici fanno principalmente riferimento a dati di letteratura, tenuto conto dei polimeri usati nei componenti dei tubi. I risultati ottenuti sul campo devono essere attentamente testati e validati dagli utilizzatori.

Nessun test su assemblati finali in combinazione con i sopracitati elementi chimici sono normalmente validati.

I tubi Manuli sono concepiti per l'idraulica e non per applicazioni industriali diversificate con diversi elementi chimici.

La copertura esterna dei tubi è concepita per proteggere il rinforzo da influenza meccaniche (abrasione, agenti atmosferici esterni, ecc), I componenti della copertura non sono ideati per dimostrare la stessa resistenza chimica dei componenti del tubo interno. Manuli Hydraulics deve essere consultata circa la compatibilità della copertura, nel caso che l'applicazione preveda un'esposizione prolungata o l'immersione in un liquido: in ogni caso i tubi idraulici della gamma Manuli non sono progettati per l'immersione in fluidi di esercizio. Questo tipo di applicazioni speciali dovrebbe essere evitato o studiato attentamente applicando protezioni esterne aggiuntive per i tubi o selezionando speciali tipi di tubi, ad esempio con copertura termoplastica e validata per l'applicazione specifica. La turbolenza del fluido, l'alta temperatura e la tipologia del fluido così come altri elementi potrebbero danneggiare le proprietà o l'integrità del materiale di copertura del tubo (la miscela della copertura del tubo è disegnata per resistere a gocce d'olio e agli agenti esterni, ma non all'immersione nel fluido di servizio). Per ulteriori informazioni contattate Manuli Hydraulics.

COME USARE LA TABELLA

- i fluidi idraulici sono elencati in ordine alfabetico unitamente al nome del produttore, i fluidi chimici sono elencati in ordine alfabetico;
- cercare il tipo di tubo e leggere il valore di compatibilità (veder la scala di valori);
- definire la selezione appropriata per l'applicazione, scegliendo il miglior valore.

LEGENDA DEI VALORI

E = Excellent (Eccellente) - Piccole o trascurabili variazioni delle proprietà della miscela: nessun problema per l'utilizzo.

La vita in esercizio può superare le aspettative.

G = Good (buono) - Piccole variazioni di alcune proprietà della miscela. La vita in esercizio è normalmente in linea con le aspettative standard.

C = Conditional (dipendente dalle applicazioni applicative) - Variazioni significative di alcune proprietà della miscela. La vita in esercizio può essere ridotta; una durabilità più elevata può essere raggiunta con ridotte severità della condizioni di esercizio (temperatura in particolare) o con una selezione di tubo sovradimensionato.

HOSES - FLUID COMPATIBILITY CHART

INTRODUCTION

IT

Quando possibile, si raccomanda di effettuare una verifica con le effettive condizioni di esercizio.

X = Not recommended (non raccomandanto) - Non utilizzabile, severi effetti sulle proprietà fisiche.

NOTA:

- Gli O'Ring usati con gli innesti rapidi devono essere considerati per la compatibilità chimica con i fluidi da utilizzare. Lo stesso vale per i raccordi che presentano internamente o'ring, come per esempio raccordo metrico femmina cono 24°, ecc. Gli O'Ring standard dei raccordi Manuli sono prodotti con gomma nitrilica (NBR), altamente compatibile a livello chimico con tutti i fluidi idraulici. Nel caso di utilizzo di speciali fluidi o in presenza di temperature molto elevate, devono essere utilizzate O'Ring con materiali differenti. Per ulteriori informazioni contattate Manuli Hydraulics. Prendere visione del Manuale Tecnico per le dimensioni degli O'Ring.
- La compatibilità dei raccordi con i fluidi trasportati è un fattore essenziale per evitare reazioni chimiche che potrebbero far ri-lasciare fluidi e intaccare le connessioni con il risultato di causare gravi danni a persone o cose. I raccordi standard Manuli sono realizzati con acciaio al carbonio con zincatura esente da cromo esavalente.

HOSES - FLUID COMPATIBILITY CHART

OILS CLASSIFICATION - ACCORDING TO ISO 6743-4

STD HYDRAULIC OILS

HH – highly refined mineral oils

HS – synthetic fluids

FLAME RESISTANT OILS

WATER BASED

HFA – Fluids with not less than 80% of H₂O

- HFAE Oil + Water + Additives
- HFAS Chemical solutions + Water

HFB – Water and oil emulsions - H₂O>40%

HFC – Water and Glycols – 35%>H₂O>65%

NO WATER BASED

HFD – Synthetic fluids with no water

- HFDR – Phosphoric esters
- HFDS – Chlorinated hydrocarbons
- HFDT – Mixture of HFDR and HFDS
- HFDU – other synthetic fluids

ECOLOGICALLY ACCEPTABLE OILS (EAHF) – BIODEGRADABLE

Ecologically Acceptable Hydraulic Fluids (EAHF) can provide benefits in terms of avoiding crop, ground and water contamination.

SYNTHETIC OILS

HPG – Polyglycols

HEPG (Hydraulic Fluids based on Polyglycols)

HE – Polyesters

HEES (Hydraulic Oils Environmental Synthetic Esters)

VEGETABLE OILS

HE – Polyesters

HETG (Rapeseed, sunflower)

HOSES - FLUID COMPATIBILITY CHART

FLUIDS COMPATIBILITY

	ISO 6743	GOLDEN SPIRAL DIAMOND SPIRAL SHIELDMASTER ROCKMASTER XTRAFLEX GOLDENISO LL	ETERNITY NOZONE 2K	TRACTOR SHIELDMASTER ROCKMASTER HARVESTER/17 PILOT LYTEFLEX COVER GOLDENISO AW TWINPOWER	EQUATOR	ASTRO SPIRITEX/K MULTITEX PUSH FIT	HYDROPLAST HYDROTWIN
FLUID	TYPE	WIRE SPIRAL	SPECIAL WIRE BRAIDED	WIRE BRAIDED	HT WIRE BRAIDED	TEXTILE BRAIDED	TPE TEXTILE BRAIDED
ACT Ecosafe FR	HFDU	G	G	G	G	G	-
ADDINOL OKOSYNTH SUPER HEES 46	HEES	-	-	G	-	-	-
ADDINOL OKOSYNTH SUPER HEES 46 S	HEES	G	G	G	C	-	-
AGIP Aeroshell Fluid 41	HH	E	G	G	G	E	C
AGIP ARNICA 46	HH	E	G	G	E	G	-
AGIP Arnica Extra Plus	HEES	G	G	G	C	G	E
AGIP Arnica Plus	HEES	E	E	E	E	E	E
AGIP Arnica S46	HFDU	E	E	E	G	E	E
AGIP ATF 2D Gear	HH	G	G	G	G	C	-
AGIP OSO 32	HH	E	E	E	E	E	G
AGIP SINT 2000	HS	G	G	E	G	E	G
AGIP Tecsint SL5W40	HS	E	G	G	G	-	-
AKZO Fyrquel	HFDU	X	X	X	-	X	-
AMBRA Hitech 46	HH	E	E	E	G	E	G
ANDEROL 497	HEES	G	C	G	C	G	-
ANDEROL 8768	HS	G	G	C	G	G	-
API HS 46	HH	G	C	C	E	-	-
ARAL Vitam DF Top 46	HH	E	G	G	-	G	G
ARAL Vitam EHF 46	HEES	E	E	G	G	G	G
ATLAS COPCO PAROIL S BULK	HS	G	C	C	G	C	-
ATLAS Copco Roto H	HS	G	G	G	E	G	E
ATLAS Copco Roto Inject Fluid	HH	E	G	G	G	G	E
ATLAS Copco Roto Inject Fluid Plus	HS	E	G	G	E	G	E
AVIA HVI 46	HS	G	G	G	E	G	-
AVIA Syntofluid F 46	HEES	E	G	E	G	G	E
AVIA Syntofluid N 32	HEES	G	G	E	G	E	G
AVIA Syntofluid N 46	HEES	E	E	G	C	E	G
AVIA Syntofluid PE B 30	HS	G	G	G	-	G	G
AVIA Syntofluid PE B 50	HS	G	C	C	G	G	-
BINOL Hydra P ii 46	HETG	E	E	G	-	G	-
BP A 0629L/028	HS	G	G	G	E	G	G
BP Biohyd SE-S 46	HEES	G	G	E	G	E	-
BP ENERGOL HLP 46	HH	G	G	G	-	-	-
BP Vanellus C 5	HH	E	G	G	G	-	-
BREMER Rivolta SBH 23	HEES	E	G	E	G	G	E
CALTEX RANDO HD	HH	G	C	C	G	-	-
CASTROL Aero HF 585 B	HH	E	G	G	G	E	C
CASTROL Anvol SWX 68	HFDU	E	G	E	G	G	-
CASTROL Biotech Alpin 22	HETG	E	E	E	C	E	-
CASTROL Brayco 717	HH	E	G	G	G	G	G
CASTROL Carelube HTG	HETG	G	G	G	G	G	G
CASTROL Hyspin EL 46	HEES	E	G	E	-	E	-
CASTROL Hyspin HDH 7000	HH	E	E	E	E	E	-
CASTROL Icematic SW 100	POE-AC	G	G	G	-	C	E

HOSES - FLUID COMPATIBILITY CHART

FLUIDS COMPATIBILITY

	ISO 6743	GOLDEN SPIR DIAMOND SPIR SHIELDMASTER ROCKMASTER XTRAFLEX GOLDENISO LL	ETERNITY NOZONE 2K	TRACTOR SHIELDMASTER ROCKMASTER HARVESTER/17 PILOT LYTEFLEX COVER GOLDENISO AW TWINPOWER	EQUATOR	ASTRO SPIRTEX/K MULTITEX PUSH FIT	HYDROPLAST HYDROTWIN
FLUID	TYPE	WIRE SPIRAL	SPECIAL WIRE BRAIDED	WIRE BRAIDED	HT WIRE BRAIDED	TEXTILE BRAIDED	TPE TEXTILE BRAIDED
CASTROL Lift oil	HH	G	G	G	G	G	G
CASTROL PRODUCT L 571	HH	E	G	G	G	G	-
CASTROLTransynd RD	HS	G	G	G	E	G	E
CEPSA Hydraulico HM 46	HH	E	E	G	E	G	E
CHEVRON Hydraulic AW 46	HH	E	E	G	G	G	-
CHEVRON Rycon MV	HH	E	G	G	G	G	-
DOT 3	HPG	G	G	X	X	X	X
DOT 4	HPG	G	G	X	C	X	C
ESSO Nuto H46	HH	G	G	G	E	G	E
ESSO Univis N46	HH	E	G	G	E	C	-
EXXON HUMBLE H 46	HH	E	G	G	E	G	-
EXXON MOBIL 424	HH	G	G	G	G	-	-
FINKE Aviaticon HY HE	HEES	G	G	E	-	E	G
FOLTZERMSRINGOLI HYDRA 46	HH	C	C	C	E	-	-
FRAGOLHE 46	HEES	E	G	E	G	G	E
FUCHS Dea Triton SE 55	POE-AC	G	G	G	-	G	E
FUCHS Eco Hyd 46 S NWG	HEES	G	G	G	C	G	-
FUCHS Planto Hytrac	HH	G	G	G	G	G	G
FUCHS Plantohyd 46s	HEES	E	G	E	G	E	E
FUCHS Plantohyd N 46	HETG	G	G	E	E	E	E
FUCHS PLANTOHYD SUPER S46	HEES	G	C	G	C	-	-
FUCHS Plantosyn 3268 Eco	HEES	G	C	E	E	E	G
FUCHS Plantosyn 46 HVI	HEES	G	C	C	G	G	G
FUCHS Renolin B15 VG46	HH	G	G	G	-	-	-
FUCHS Renolin MR 520	HH	G	G	E	G	E	E
GULF Armony AW 46	HH	E	E	G	E	C	E
HOUGHTON Cosmolubric HF 130	HFDU	G	G	G	C	G	-
HOUGHTON Safe 620	HFC	G	G	G	X	-	-
HOUGHTON-Safe 273 CTF	HFC	E	G	E	X	-	-
IDEMITSU DAPHNE 46	HH	G	G	G	E	G	-
IGOL Marine 15W-40	HH	G	G	G	-	-	-
IGOL MATIC FLUID BIO 46	HETG	E	G	G	E	G	-
IGOL TICMA FLUID BIO 46	HEES	G	G	G	C	G	-
IGOL ZNS 46	HH	E	G	G	E	-	-
INGERSOLL RAND SSR Ultra plus coolant	POE-AC	G	G	G	E	G	G
INGERSOLL RAND Ultra Plus Coolant	POE-AC	G	G	G	E	-	-
IRVING HYDRAULICS 46	HH	G	G	G	E	G	-
ISAFLEX KOMPRESSOIL SE	HEES	E	G	G	C	-	-
JACOBSEN Greens care	HETG	G	-	G	-	-	-
J. Deere Biohygard II	HETG	E	E	E	E	G	G
KLUBER HYSYN FG46	HS	G	C	C	G	-	-
KLUBER SUMMIT HYSYN FG 46	HS	G	G	G	G	C	-
KOLLEIK PL 42 Hydraulik Kolleik		G	C	C	-	-	-
KOMATSU Genuine Bio 46 G4	HEES	E	E	E	E	G	E

HOSES - FLUID COMPATIBILITY CHART

FLUIDS COMPATIBILITY

	ISO 6743	GOLDEN SPIR DIAMONDSPIR SHIELDMASTER ROCKMASTER XTRAFLEX GOLDENISO LL	ETERNITY NOZONE 2K	TRACTOR SHIELDMASTER ROCKMASTER HARVESTER/17 PILOT LYTEFLEX COVER GOLDENISO AW TWINPOWER	EQUATOR	ASTRO SPIRTEX/K MULTITEX PUSH FIT	HYDROPLAST HYDROTWIN
FLUID	TYPE	WIRE SPIRAL	SPECIAL WIRE BRAIDED	WIRE BRAIDED	HT WIRE BRAIDED	TEXTILE BRAIDED	TPE TEXTILE BRAIDED
KOMATSUKPO 10 Powertrain TO 10	HH	E	E	G	G	G	E
LUBRIZOL Emkarate RL 1005	POE-AC	G	G	C	-	C	G
MAV Sint Plus 2005 ISO46	HS	G	G	C	C	G	-
METLUBE HFR 220	HFC	G	G	C	E	C	-
MICRO QUIMICA Microcorte 530	HFB	G	G	G	X	C	-
MILLERS Millfood 32	HS	G	G	G	E	G	E
MOBIL Aero HF MIL H5606	HH	E	G	G	G	G	-
MOBIL Arctic EAL 22	POE-AC	E	E	G	G	G	G
MOBIL DTE 10 EXCEL	HH	E	G	C	G	G	-
MOBIL DTE 13	HH	E	G	G	E	G	-
MOBIL DTE 25	HH	G	G	G	E	G	E
MOBIL DTE EXCEL 46	HH	G	G	G	E	C	-
MOBIL EAL 224 H	HETG	G	G	E	X	E	G
MOBIL Hydrofluid HFDU	HFDU	E	E	E	G	E	E
MOBIL Jet oil II	HS	G	G	G	C	E	-
MOBIL Rarus SHC 1026	HS	E	G	G	E	G	-
MOBIL SHC 524	HS	E	G	G	E	-	-
MOBIL Therm 605	HH	G	G	G	E	G	-
MOTOREX Oeokosynt 46	HEES	G	G	G	G	E	-
NALCO Varidos FSK 40%	HFB	E	E	E	E	E	-
NESTE BIO Hydraulik LONGLIFE 46	HEES	G	C	G	C	-	-
NESTE BIO Hydraulik SE 46	HEES	E	G	G	G	-	-
NESTE Biohydraulik SE 46	HEES	E	E	E	G	E	G
NESTE HYDRAULIK 32 SUPER	HH	E	G	C	E	-	-
NESTE HYDRAULIK 46 SUPER	HH	E	G	C	E	-	-
NYCO Hydraulic Oil FH 51 - MIL H5606	HH	G	G	E	C	E	C
NYCO Hydraulic Oil FH 6 - MIL H6083	HH	G	G	E	C	E	C
NYCO Hydraulic oil FH3 (MIL H 46170 C-1)	HS	E	G	G	E	G	-
OMV Biohyd MS 46 (100°C)	HEES	G	G	G	-	G	G
OMV HLP AL 46	HH	E	G	G	E	C	-
PAG SP 10	HPG	G	G	G	-	C	E
PANOLIN EP Gear Synth 30 VDT	HEES	G	C	G	C	G	G
PANOLIN GRO Sint 46	HEES	G	G	G	X	-	E
PANOLIN HLP SYNTH 46	HEES	E	C	G	X	G	E
PENTOSIN CHF 11 S (ATF fluid)	HS	G	G	C	E	C	-
PETRO CANADA Hydrex aw 46	HH	G	G	C	G	G	-
PETRO CANADA HYDREX MV 60	HH	G	G	G	G	G	-
PETROFER Ultra Safe 620	HFC	E	E	E	X	E	-
Q8 Handel 68	HH	G	G	C	E	G	E
Q8 Heller 46	HH	E	G	G	E	G	-
Q8 Hogart 46	HH	G	C	C	G	G	-
Q8 Holbein	HEES	E	G	G	G	G	-
Q8 T720 15W-40	HH	E	G	G	E	G	-
QUAKER Greensave N 40	HETG	G	G	G	C	G	G

HOSES - FLUID COMPATIBILITY CHART

FLUIDS COMPATIBILITY

	ISO 6743	GOLDEN SPIR DIAMOND SPIR SHIELDMASTER ROCKMASTER XTRAFLEX GOLDENISO LL	ETERNITY NOZONE 2K	TRACTOR SHIELDMASTER ROCKMASTER HARVESTER/17 PILOT LYTEFLEX COVER GOLDENISO AW TWINPOWER	EQUATOR	ASTRO SPIRTEX/K MULTITEX PUSH FIT	HYDROPLAST HYDROTWIN
FLUID	TYPE	WIRE SPIRAL	SPECIAL WIRE BRAIDED	WIRE BRAIDED	HT WIRE BRAIDED	TEXTILE BRAIDED	TPE TEXTILE BRAIDED
QUAKER Quintolubric 888	HFDU	G	G	G	C	G	-
QUAKER QUINTOLUBRIC 888-46	HFDU	G	C	G	C	-	-
QUAKER QUINTOLUBRIC 888-68	HFDU	G	C	G	C	-	-
QUAKER Quintolubric N 822-300	HFDU	G	C	G	-	G	-
RAISIO Biosafe SE 46	HEES	G	G	G	X	G	-
RAUTIO ERGO MIX	HH	G	G	C	E	-	-
SHAEFFER 112 NZ HTC 32	HH	G	G	C	G	C	-
SHAEFFER 254 SUPREME ISO 32 TH 220	HS	G	C	C	G	C	-
SHAEFFER 112 HTC	HS	G	G	G	E	-	-
SHAEFFER 275S DILEX SUPREME MEHF HYD	HS	G	C	C	E	-	-
SHELL Arctic 32	HH	G	G	E	G	E	E
SHELL ATF III	HH	E	G	G	E	G	-
SHELL Cassida HF 46	HS	G	G	G	E	G	G
SHELL Corena D	HH	G	G	G	E	G	G
SHELL Donax TD	HH	E	G	G	E	-	-
SHELL Helix Ultra 5W40	HS	G	G	G	E	G	-
SHELL Iruis Fluid DU-NA 68	HFDU	G	G	G	G	G	-
SHELL NATURELLE HF-E15	HEES	E	G	G	G	E	G
SHELL Rimula R3	HH	E	G	G	E	G	E
SHELL Rimula X30	HH	G	G	G	E	-	-
SHELL ROTELLA TMG SAE 15W-40	HH	G	G	G	E	G	-
SHELL SPIRAX ASX GEAR SAE 80W-140	HS	G	G	G	G	G	-
SHELL Tegula V32	HH	E	G	G	E	G	E
SHELL Tellus 46	HH	E	G	G	E	G	E
SHELL Tellus 68	HH	E	G	G	E	C	-
SHELL Tellus 100	HH	G	G	G	E	G	-
SHELL Tellus EE	HS	E	C	C	G	X	-
SHELL TELLUS H 46	HH	G	G	G	-	-	-
SHELL Tellus S 46	HH	E	G	G	E	G	E
SHELL Tellus T 32	HH	E	G	G	E	G	-
SHELL Tellus T 46	HH	E	G	G	E	-	-
SHELL Tellus T 68	HH	E	G	G	E	G	-
SHELL Tellus TX 68	HH	G	C	G	G	G	-
SHELL V oil 1404	HH	G	G	G	G	G	G
SOLUTIA Skydroll 500	HFDU	X	X	X	X	X	X
STATOIL HYDRAWAY EXTREME46	HH	E	G	G	E	-	-
STUART Hydrocor CC44	HFC	C	C	G	X	G	-
STUART Isocore E68 Plus	HPG	E	E	G	G	E	-
SUNOCO Sunvis 746	HH	E	G	G	E	C	G
SUNOCO Sunvis 846	HH	G	G	G	G	G	G
TAMOIL ATF II D	HH	G	G	G	G	-	-
TAMOIL Green Hydro Safety 46	HETG	E	E	E	-	E	G
TEBOIL Hydraulic arctic	HH	G	G	E	G	E	E
TEBOIL Eco 46	HEES	E	E	G	C	G	G

FLUIDS COMPATIBILITY

892  **manuli®**
HYDRAULICS

HOSES - FLUID COMPATIBILITY CHART

CHEMICALS COMPATIBILITY

	GOLDEN SPIR DIAMOND SPIR SHIELDMASTER ROCKMASTER XTRAFLEX GOLDENISO LL	ETERNITY NOZONE 2K	TRACTOR SHIELDMASTER ROCKMASTER HARVESTER/17 PILOT LYTEFLEX COVER GOLDENISO AW TWINPOWER	EQUATOR	ASTRO SPIRTEX/K MULTITEX PUSH FIT	HYDROPLAST HYDROTWIN
FLUID	WIRE SPIRAL	SPECIAL WIRE BRAIDED	WIRE BRAIDED	HT WIRE BRAIDED	TEXTILE BRAIDED	TPE TEXTILE BRAIDED
A Acetaldehyde	C	C	C	C	C	-
Acetic Acid, 10%	C	C	C	G	C	E
Acetic Acid, 25% 100°C	C	C	C	C	C	G
Acetic Acid glacial	C	C	C	C	C	G
Acetone	C	C	C	C	C	E
Air (80°C)	G	G	G	E	G	G
Air (100°C)	G	G	C	E	C	X
Air (150°C)	X	X	X	E	X	X
Ammonia, gaseous	G	G	E	G	E	X
Ammonia, liquid	C	C	G	C	G	X
Ammonium Hydroxide, 10%	E	E	G	E	G	-
Ammonium Hydroxide, conc	E	E	C	E	C	-
Ammonium nitrate (aqueous solutions)	G	G	G	G	G	G
Ammonium phosphate, mon-di-tri basic (aq. Sol)	E	E	E	E	E	G
Ammonium sulphate (aqueous solution)	E	E	E	E	E	G
Aniline	C	C	C	C	C	X
Aqua regia	C	C	C	X	C	-
ASTM oil n°1, 100°C	E	E	E	E	E	E
ASTM oil n°2, 100°C	G	G	E	G	E	E
ASTM oil n°3, 100°C	E	C	E	C	E	E
B Benzene	C	X	C	X	C	E
Boric acid 10% 100°C	E	E	E	E	E	E
Brake fluid (SAE J 1703d)	X	-	X	G	X	-
Butanol	E	E	E	E	E	E
C Calcium bicarbonate	E	E	E	E	E	-
Calcium hydroxide (Aqueous suspensions)	E	E	E	E	E	-
Carbonic anhydride	G	G	G	G	G	E
Chlorine	C	C	C	G	C	X
Chloroform	C	C	C	C	C	X
Citric Acid, 33%	G	G	G	G	G	E
Crude oil	E	C	E	C	E	G
D Dibenzyl ether	X	X	X	X	X	-
Dibutyl phthalate (DBP)	C	X	C	X	C	E
Diesel fuel (70°C)	G	G	G	C	E	E
Diesel fuel Bio RME	C	X	C	X	E	G
E Epichlorhydrine	X	X	X	X	X	X
Ethyl acetate	C	X	C	C	C	G
Ethyl alcohol	E	E	E	E	E	E
Ethyl ether (70°C)	G	C	G	-	G	-
Ethylene	E	E	E	-	E	E
Ethylene glycole	E	E	E	G	E	E
Ethylene glycole (100°C)	E	G	E	G	E	G
F Formaldehyde	C	G	C	C	C	G
Formic acid 23°C (saturated solution)	G	G	G	G	G	G

HOSES - FLUID COMPATIBILITY CHART

CHEMICALS COMPATIBILITY

	GOLDEN SPIR DIAMOND SPIR SHIELDMASTER ROCKMASTER XTRAFLEX GOLDEN ISO LL	ETERNITY NOZONE 2K	TRACTOR SHIELDMASTER ROCKMASTER HARVESTER/17 PILOT LYTEFLEX COVER GOLDEN ISO AW TWINPOWER	EQUATOR	ASTRO SPIRTEX/K MULTITEX PUSH FIT	HYDROPLAST HYDROTWIN
FLUID	WIRE SPIRAL	SPECIAL WIRE BRAIDED	WIRE BRAIDED	HT WIRE BRAIDED	TEXTILE BRAIDED	TPE TEXTILE BRAIDED
Formic acid 75°C (saturated solution)	C	C	C	C	C	C
Fuel A (iso-octane)	E	G	E	G	E	E
Fuel B (70% iso-octane, 30% toluene)	G	C	G	C	E	E
Fuel C (50% iso-octane, 50% toluene)	C	X	C	X	G	E
G Glycerine	E	E	E	E	E	E
H Heptane	E	C	E	C	E	E
Hydraulic oils (see detailed table)	*	*	*	*	*	*
Hydrochloric acid, 10%	G	G	G	G	G	G
Hydrochloric acid, 37%	G	C	G	G	G	X
Hydrochloric acid, 37% 70°C	X	X	X	X	X	X
Hydrocyanic acid 20%	C	C	C	-	C	-
Hydrogen sulphide	X	G	X	C	X	E
I Isobutyl alcohol	G	E	G	E	G	E
Isopropyl alcohol	G	E	G	E	G	E
Iso-octane	E	G	E	G	E	E
K Kerosene (aromatics 40% max, 70°C)	G	C	G	C	E	-
L Lead free petrol	E	G	E	C	E	G
M Magnesium hydroxide (aqueous solutions)	G	E	G	E	G	-
Mercury	E	E	E	E	E	E
Methanol	G	E	G	E	G	G
Methyl methacrylate	X	X	X	X	X	-
Methylethylketone (MEK)	X	C	X	C	X	E
N Nitric acid, concentrated 65%	X	X	X	C	X	X
Nitric acid, diluted 10% 50°C	C	X	C	C	C	X
Nitric acid fuming	X	X	X	X	X	X
Nitrogen	G	G	G	G	G	G
O Oleic acid	C	C	C	G	C	E
Oleum	G	C	G	C	G	X
Oxalic acid 25% 80°C	G	G	G	G	G	-
Oxygen (80°C)	C	G	C	E	C	E
P Paraffin	E	E	E	E	E	E
Pentane	E	C	E	C	E	E
Petrol	E	C	E	C	E	E
Petroleum, 70°C	E	G	E	C	E	E
Phenol	C	C	C	C	C	C
Phosphoric acid 20%	G	C	G	C	G	-
Phosphoric acid 60% 50°C	C	X	C	X	C	-
Phosphoric acid 85%	C	X	C	X	C	-
Phosphorous tri-chloride	X	X	X	X	X	-
Picric acid 10% 100°C	C	C	C	G	C	-
Potassium chloride (aqueous solution)	E	E	E	E	E	-
Potassium hydroxide 70°C (medium high conc.)	G	G	G	E	G	E
Potassium sulphate (aqueous solution)	E	E	E	E	E	-
S Sea water	E	E	E	C	E	E

CHEMICALS COMPATIBILITY



HOSES BY WORKING PRESSURE

HOSE SIZE	WORKING PRESSURE (bar)																		
	DN	5	6	8	10	12	16	19	22	25	28	31	35	38	46	51	60	63	76
	dash	-03	-04	-05	-06	-08	-10	-12	-16	-16	-20	-20	-24	-24	-32	-32	-38	-40	-48
GOLDENSPIR®/4SP			485		450	420	380	380		320									
GOLDENSPIR®/4SH								420		385		350		300		250			
TRACTOR®/1T	250	225	215	180	160	130	105		88		63		50			40	50		
TRACTOR®/2T	415	400	350	330	275	250	215		165		125		90			80	90		
TRACTOR®/1K		225	215	180	160	130	105		88		63		50			40		50	35
TRACTOR®/2K		400	350	330	275	250	215		165		125		100			90		70	45
LYTE-FLEX®			350	297	280	245	210	210		140									
HARVESTER®/17 COVER	210	210	157	140	122		105		56		43		35		24				
SPIRTEX/K							21	21		17		14		10		7		4	4
MULTITEX	35	30	30	30	30	30	30		30										
ASTRO/2		75	68	63	58	50	45		40		35								
ASTRO/3		145	130	110	93	80	70		55		45		40			33			
HYDROPLAST	210	192	187	175	140														
HYDROTWIN	210	192	187	175	140														
ROCKMASTER®/1SN		225	215	180	160	130	105		90		65		50			40	50		
ROCKMASTER®/2SN		400	350	350	350	250	215		175		140		100			90	90		
ROCKMASTER®/2ST	415	400	350	350	350	250	215		175		140		100			90			
ROCKMASTER®/2PLUS		450		400	362	340	310		240		175		146			130			70
ROCKMASTER®/1SC		260	250	225	190	150	150		110		75		50			50			
ROCKMASTER®/2SC	420	400	350	330	275	250	245		210		140		100			90		70	45
ROCKMASTER®/4SP		485		450	420	380	380		320		210		185			175			
ROCKMASTER®/4SH						450	420		385		350		300			250			
ROCKMASTER®/12				280	280	280	280		280		210		175			175			
ROCKMASTER®/13	690			690	620		350		350		350		350			350			
ROCKMASTER®/15							420		420		420		420						
EQUATOR™/1		225	215	180	160	130	105		88		65		50			40		35	
EQUATOR™/2		400	350	330	275	250	215		175		150		100			90			
NOZONE®/2K		400	350	330	275	250	215												
GOLDENISO®/21 ANTIWEAR		210	210	210	210	210	210		210										
GOLDENISO®/28 ANTIWEAR		280	280	280	280	280	280												
GOLDENISO®/45 LONGLIFE						460	460		460		450								
TWINPOWER®/4000					280	280													
TWINPOWER®/5000					350	350													
SHIELDMASTER®/2000		140			140	140													
SHIELDMASTER®/4000		276	276	276	276	276	276		276		276		276			276			
SHIELDMASTER®/5000		345	345	345	345	345	345		345										
SHIELDMASTER®/6000		420		420	420	420	420		420		420		420			420			
XTRAFLEX™/4000							280		280		280								
XTRAFLEX™/5000							350		350		350								
XTRAFLEX™/6000							420		420		420								
PUSHFIT		35	35	35	25	25	21		14										
PILOT	150	150	120	100	100														
TWINPOWER®/PLUS						310													
ETERNITY™/2		450	400	365	350	300	300		225										
DIAMONDSPIR™							560		560		525		475			420		350	210
JACKMASTER		725		725															
FIREND		225		180	160		105		88										
GOLDENMINE																		200	
SHIELDMASTER®/2 PLUS MINE		450	400	400	362		310		240		175		146			130			
SHIELDMASTER®/5000 MINE		345	345	345	345	345	345		345		345								
SHIELDMASTER®/6000 MINE											420		420			420			

HOSES BY TYPE APPROVALS

	HYDRAULICS, MARINE EQUIPMENT TYPE APPROVALS							MINING SAFETY TYPE APPROVALS						GOVERNMENT, SAFETY AND SPECIAL TYPE APPROVALS			
	ABS	BV	DNV	GL	KRS	LLOYD'S REGISTER	RINA	MED	MSHA	POLISH "B"	FRAS	LOBA	MA	DCMS	Elevators EN 81-2	BWB	GOST-R
ASTRO/2				*													
ASTRO/3				*													
COVER																	*
CPH/2SC (BLUE)									*			*					*
DIAMONDSPIR	*								*		*	*					*
EQUATOR/1	*	*	*	*		*		*	*								*
EQUATOR/1 (BLUE)	*	*	*	*		*		*	*								*
EQUATOR/2	*	*	*	*		*		*	*								*
EQUATOR/2 (BLUE)	*	*	*	*		*		*	*								*
ETERNITY/2			*					*	*			*					*
FIREND									*								*
GOLDENBLAST									*								*
GOLDENBLAST/PLUS									*								*
GOLDENBLAST/SIX									*								*
GOLDENDRILL									*								*
GOLDENISO/21 ANTIWEAR									*								*
GOLDENISO/28 ANTIWEAR									*								*
GOLDENISO/45 LONGLIFE									*								*
GOLDENMINE									*								*
GOLDENSPIR/4SH	*	*	*	*	*	*			*							*	*
GOLDENSPIR/4SP	*	*	*	*	*	*			*							*	*
HARVESTER/17						*											*
HYDROPLAST																	*
HYDROTWIN																	*
JACKMASTER																	*
K-JET																	*
LYTE-FLEX						*											*
MULTITEX																	*
NOZONE/2K									*								*
PILOT									*								*
PROJET																	*
PUSHFIT																	
REFRIFAST																	
REFRIMASTER																	
REFRIMASTER/PLUS																	
REFRISTAR																	*
ROCKMASTER/12	*	*				*		*	*		*	*	*				*
ROCKMASTER/13	*	*					*	*	*	*	*	*	*				*
ROCKMASTER/15	*	*	*	*		*		*	*	*	*	*	*				*
ROCKMASTER/1SC						*			*		*	*					*
ROCKMASTER/1SN		*	*					*			*	*					*
ROCKMASTER/2PLUS		*	*			*			*		*	*	*				*
ROCKMASTER/2SC						*	*		*	*	*	*	*				*
ROCKMASTER/2SN		*	*				*	*	*	*	*	*		*			*
ROCKMASTER/2ST		*				*			*	*	*	*					*

HOSES BY TYPE APPROVALS

	HYDRAULICS, MARINE EQUIPMENT TYPE APPROVALS								MINING SAFETY TYPE APPROVALS						GOVERNMENT, SAFETY AND SPECIAL TYPE APPROVALS		
	ABS	BV	DNV	GL	KRS	LLOYD'S REGISTER	RINA	MED	MSHA	POLISH "B"	FRAS	LOBA	MA	DGMS	Elevators EN 81-2	BWB	GOST-R
ROCKMASTER/4SH			*			*	*	*	*	*	*	*	*	*			*
ROCKMASTER/4SP			*				*	*	*	*	*	*	*	*			*
SHIELDMASTER/2000											*	*	*				*
SHIELDMASTER/2PLUS MINE									*			*					*
SHIELDMASTER/4000																	*
SHIELDMASTER/5000																	*
SHIELDMASTER/5000 MINE									*			*					*
SHIELDMASTER/6000																	*
SHIELDMASTER/6000 MINE									*			*					*
SPIRTEX/K																	*
SUPERJET																	*
SUPERJET/PLUS																	*
TRACTOR/1K	*			*		*			*						*		*
TRACTOR/1T	*	*	*	*	*	*					*					*	*
TRACTOR/2K	*		*	*		*									*	*	*
TRACTOR/2T	*	*	*	*	*	*										*	*
TWINPOWER/4000																	*
TWINPOWER/5000									*								*
TWINPOWER/PLUS									*								*
XTRAFLEX/4000									*								*
XTRAFLEX/5000									*								*
XTRAFLEX/6000									*								*

Remark! Please verify hose size extension, expiry date and production plant of reference of the type approval certificate.

备注! 请检验型式认证证明中参考软管的延伸尺寸、有效日期和生产地。

Wichtig! Prüfen Sie die Nenngröße, das Ablaufdatum und das Produktionswerk auf der Zulassungsurkunde.

Nota! Verificare la dimensione del tubo, la data di validità e lo stabilimento di produzione a cui il certificato fa riferimento.

MRI TYPE APPROVALS: certification bodies

ABS	American Bureau of Shipping
BV	Bureau Veritas
BWB	Bundesamt für Wehrtechnik und Beschaffung (available upon request)
DGMS	Directorate General of Mines Safety - India
DNV	Det Norske Veritas
FRAS	Fire Resistant and Anti-Static (Australian Dept. Mineral Resources)
GL	Germanischer Lloyd
GOST-R	GOST-R accreditation (Russian Federation and CIS)
KRS	Korean Register of Shipping
LOBA	Landesoberbergamt Nordrhein - Westfalen
LR	Lloyd's Register of Shipping
MA	Chinese Mining Approval
MED	Marine Equipment Directive (European Directive)
MSHA	Mine Safety and Health Administration
POLISH 	Polish Safety Certification type "B" for mining
RINA	Registro Italiano Navale



To identify thread size termination end, measure the exterior male thread diameter O.D. or the internal female thread diameter I.D., and then, looking to the column mm, you will get the correspondent thread size.

为了区别端面螺纹尺寸，测量外部外螺纹外径 O.D. 或内部内螺纹内径 I.D.，然后查列表 mm 将得到相应的螺纹尺寸。

Um ein Gewinde zu bestimmen, messen Sie den Durchmesser des Außengewindes (Male O.D.) bzw. des Innengewindes (Female I.D.), suchen Sie den gemessenen Wert in der Spalte „mm“ und lesen Sie in der Spalte „Male O.D.“ bzw. „Female I.D.“ das entsprechende Gewinde ab.

Per identificare la filettatura delle parti terminali, misurare il diametro esterno nei maschi (O.D.) o il diametro interno nelle femmine (I.D.), quindi controllare nella colonna mm la misura a cui corrisponde il filetto.



MALE O.D.	MM	FEMALE I.D.
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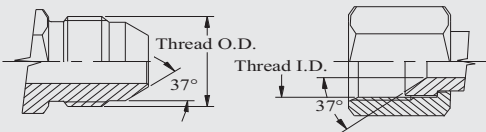
	8,5	3/8"-24 UNF
	8,7	1/8"-28 GAS
	9,2	1/8"-27 NPSM
3/8"-24 UNF	9,4	
1/8"-28 GAS	9,6	
M10x1	10,0	7/16"-20 UNF
1/8"-27 NPTF	10,4	
	10,5	M12x1,5
7/16"-20 UNF	11,0	
	11,4	1/2"-20 UNF
	11,6	1/4"-19 GAS
M12x1,5	12,0	
	12,2	1/4"-18 NPSM
1/2"-20 UNF	12,5	M14x1,5
1/4"-19 GAS	13,0	9/16"-18 UNF
1/4"-18 NPTF	13,9	
M14x1,5	14,0	
9/16"-18 UNF	14,2	
	14,5	M16x1,5
	14,6	5/8"-18 UNF
	15,1	3/8"-19 GAS
	15,5	3/8"-18 NPSM
5/8"-18 UNF	15,7	
M16x1,5	16,0	11/16"-16 UN
	16,5	M18x1,5
3/8"-19 GAS	16,6	
3/8"-18 NPTF	17,3	
11/16"-16 UN	17,4	3/4"-16 UNF
M18x1,5	18,0	
	18,5	M20x1,5
	18,8	1/2"-14 GAS
3/4"-16 UNF	19,0	13/16"-16 UN

MALE O.D.	MM	FEMALE I.D.
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	19,2	1/2"-14 NPSM
M20x1,5	20,0	
	20,3	7/8"-14 UNF
13/16"-16 UN	20,5	M22x1,5
1/2"-14 GAS	20,8	
	21,1	5/8"-14 GAS
1/2"-14 NPTF	21,6	
M22x1,5	22,0	
7/8"-14 UNF	22,2	
	22,5	M24x1,5
5/8"-14 GAS	22,8	
	23,8	1"-14 UNS
M24x1,5	24,0	
	24,5	M26x1,5
	24,6	3/4"-14 GAS-NPSM
	24,9	1.1/16"-12 UN
	25,0	M27x2
1"-14 UNS	25,3	
M26x1,5	26,0	
3/4"-14 GAS	26,3	
1.1/16"-12 UN	26,7	
3/4"-14 NPTF	26,9	
M27x2	27,0	
	27,9	1.3/16"-12 UN
	28,0	M30x2
M30x2	30,0	
1.3/16"-12 UN	30,1	
	30,7	1"-11,5 NPSM
	30,9	1"-11 GAS
	31,0	M33x2
	31,2	1.5/16"-12 UN
M33x2	33,0	

MALE O.D.	MM	FEMALE I.D.
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1"-11 GAS	33,2	
1.5/16"-12 UN	33,3	
1"-11,5 NPTF	33,8	
	34,0	M36x2
M36x2	36,0	
	39,1	1.5/8"-12 UN
	39,4	1.1/4"-11,5 NPSM
	39,5	1.1/4"-11 GAS
	40,0	M42x2
1.5/8"-12 UN	41,1	
1.1/4"-11 GAS	41,7	
M42x2	42,0	
1.1/4"-11,5 NPTF	42,4	
	43,0	M45x2
M45x2	45,0	
	45,2	1.1/2"-11 GAS
	45,5	1.1/2"-11,5 NPSM
	45,7	1.7/8"-12 UN
	46,0	M48x2
1.7/8"-12 UN	47,5	
1.1/2"-11 GAS	47,7	
M48x2	48,0	
1.1/2"-11,5 NPTF	48,5	
	48,8	2"-12 UN
	50,0	M52x2
2"-12 UN	50,7	
M52x2	52,0	
	57,0	2"-11 GAS
2"-11 GAS	59,4	
2"-11,5 NPTF	60,6	
	61,2	2.1/2"-12 UN
2.1/2"-12 UN	63,3	



This connection type is very common in hydraulic circuits. Both the male and female have a 37° cone seat. When the straight threads are engaged the seal takes place. The connection is held mechanically by the threads.

WARNING: In sizes -04, -05, -08, and -10, the threads of the SAE 37° and SAE 45° are the same but the connectors have different sealing angles.

在液压系统中常用的联接型式。外螺纹头和内螺纹都有37°锥面。直螺纹啮合时进行密封。螺纹将接头联接在一起。
警告：尺寸-04、-05、-08、和-10，SAE 37°和SAE 45°螺纹相同，但接头有不同的密封面。

Dieser Anschlussstyp ist sehr gebräuchlich in hydraulischen Systemen. Sowohl Außen- als auch Innengewinde verfügen über einen 37° Konus der beim Anziehen der parallelen Gewinde für die Abdichtung sorgt. Die Verbindung wird durch die mechanische Reibung der Gewinde gehalten.

WARNUNG: In Size -04, -05, -08 und -10 sind die Gewinde bei SAE 37° und SAE 45° identisch, dürfen aber keinesfalls verwechselt werden da unterschiedliche Flankenwinkel am Konus vorliegen.

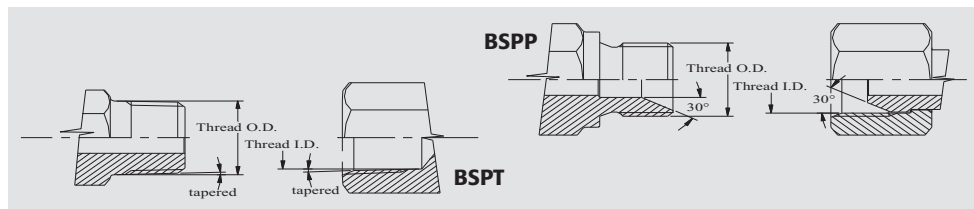
Questo tipo di adattatore è molto diffuso nei circuiti idraulici. Maschi e femmine hanno il cono di tenuta a 37° e quando sono avvitati, la tenuta è garantita meccanicamente dai filetti.

ATTENZIONE: Nelle dimensioni -04, -05, -08 e -10, le filettature del SAE 37° e SAE 45° sono le medesime, ma gli angoli di tenuta sono differenti.

INCH SIZE	DASH	NOMINAL THREAD SIZE	MALE THREAD O.D.		FEMALE THREAD I.D.		WORKING PRESSURE	SUGGESTED TORQUE VALUES (NM)	
			mm	inch	mm	inch	bar	psi	min. max.
1/4"	-04	7/16" - 20	11,2	0,44	9,9	0,39	350	5070	12 15
5/16"	-05	1/2" - 20	12,7	0,50	11,4	0,45	350	5070	18 22
3/8"	-06	9/16" - 18	14,2	0,56	12,9	0,51	350	5070	24 32
1/2"	-08	3/4" - 16	19,0	0,75	17,0	0,67	350	5070	45 52
5/8"	-10	7/8" - 14	22,5	0,88	20,3	0,80	350	5070	68 80
3/4"	-12	1.1/16" - 12	26,9	1,06	24,9	0,98	350	5070	93 105
7/8"	-14	1.3/16" - 12	30,0	1,18	27,7	1,09	280	4060	115 130
1"	-16	1.5/16" - 12	33,3	1,31	31,0	1,22	280	4060	130 148
1.1/4"	-20	1.5/8" - 12	41,4	1,63	39,1	1,54	210	3040	175 192
1.1/2"	-24	1.7/8" - 12	47,7	1,88	45,5	1,79	160	2320	215 230

British Standard Pipe - BSP (BSPP Parallel-ISO 228-PT & BSPT Tapered-ISO 7-PT)

TERMINATION ENDS



The British connection has two types of threads: BSPP and BSPT.

The BSPP thread is parallel and the male has a 30° flare seat which seals with a BSPP female on its 30° cone seat. The threads hold the connection mechanically.

The BSPT male thread is tapered and usually mates with a port. The seal takes place by thread distortion, therefore sealant is recommended. The BSPP/BSPT are similar to NPSM/NPT American connections with exception for the thread pitch that is different in most sizes.

英制接头具有两种螺纹: BSPP 和 BSPT.

BSPP 为平管纹, 外螺纹有 30° 锥面同 BSPP 内螺纹 30° 锥面密封在一起。螺纹将接头联接在一起。

BSPT 为锥面外螺纹, 通常同端口配合。螺纹扭曲产生密封, 所以推荐使用密封剂。

BSPP/BSPT 同 NPSM/NPT 美制接头相似, 但多数尺寸中螺距不同者除外。

Bei BSP Anschlüssen unterscheiden wir 2 Typen von Gewinden: BSPP und BSPT.

Das BSPP Gewinde ist parallel und das Außengewinde hat einen 30° Innenkonus der mit einem BSPP Innengewinde und dessen 30° Außenkonus dichtet. Die Verbindung wird durch die mechanische Reibung der Gewinde gehalten.

Das BSPT Außengewinde ist konisch und wird gewöhnlich in ein Gewindeloch eingeschraubt.

Die Abdichtung erfolgt durch gewaltsame Verformung des Gewindes, aus diesem Grund empfiehlt sich ein zusätzliches Dichtmittel.

BSPP/BSPT sind vergleichbar mit den Amerikanischen Anschlussformen NPSM/NPT mit Ausnahme der Gewindesteigungen, die in den meistens Nennweiten abweichen.

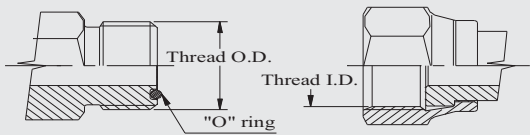
Gli adattatori della serie britannica hanno due tipi di filettature: BSPP e BSPT.

La filettatura BSPP è cilindrica e il maschio ha una svasatura a 30° che fa tenuta con una femmina BSPP con sede a cono a 30°. Le filettature tengono la connessione meccanicamente.

La filettatura maschio BSPT è conica e in genere si accoppia con una porta. La tenuta avviene con la distorsione del filetto, ragione per cui si consiglia un sigillante.

Le filettature degli adattatori BSPP e BSPT sono simili a quelle americane NPSM e NPT, tranne per il diverso passo del filetto che è diverso in maggior parte delle misure.

INCH SIZE	DASH	NOMINAL THREAD SIZE	MALE THREAD O.D.		FEMALE THREAD I.D.		WORKING PRESSURE		SUGGESTED TORQUE VALUES (NM)	
			mm	inch	mm	inch	bar	psi	min.	max.
1/8"	-02	1/8" - 28	10,3	0,41	9,4	0,37	350	5070	10	12
1/4"	-04	1/4" - 19	13,7	0,54	12,4	0,49	500	7250	15	20
3/8"	-06	3/8" - 19	17,3	0,68	15,7	0,62	460	6670	25	32
1/2"	-08	1/2" - 14	21,3	0,84	19,3	0,76	430	6230	45	55
5/8"	-10	5/8" - 14	22,9	0,90	21,1	0,83	350	5070	55	65
3/4"	-12	3/4" - 14	26,9	1,06	24,9	0,98	350	5070	80	93
1"	-16	1" - 11	33,3	1,31	31,5	1,24	280	4060	104	120
1.1/4"	-20	1.1/4" - 11	42,2	1,66	40,1	1,58	160	2320	150	170
1.1/2"	-24	1.1/2" - 11	48,3	1,90	46,2	1,82	125	1810	210	230



This connection offers the best leakage control available in the market and it is designed to work with very high pressures. The male has a straight thread with an O-ring in the face. The female has a straight thread with a machined flat face. The seal is made by the compression of the O-ring onto the female flat face and the connection is mechanically held in place by the threads.

在市场上, 这种接头拥有最好的防漏能力, 设计用于超高压系统。外螺纹有一个表面附O型圈的直螺纹。内螺纹有一个带有机加工的平面的直螺纹。O型圈压紧在内螺纹的平面上形成密封, 螺纹将接头联接在一起。

Diese Anschlussform bietet derzeit das Optimum an Dichtigkeit auf dem Markt und ist für sehr hohe Drücke geeignet. Der Außengewindeanschluss hat ein paralleles Gewinde und einen O-ring in einer Nut auf der Stirnseite. Der Dichtkopf mit Innengewinde (Überwurf- oder Crimpmutter) verfügt über eine plan abgedrehte Stirnfläche. Die Abdichtung erfolgt durch Kompression des O-ringes auf der Planfläche des Dichtkopfes. Die Verbindung wird durch die mechanische Reibung der Gewinde gehalten.

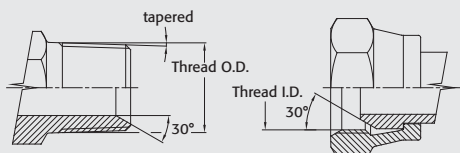
Questo collegamento offre attualmente il miglior controllo di perdite attualmente disponibile nel mercato ed è progettato per lavorare con pressioni molto alte. Il maschio ha un filetto dritto con un O-ring sulla faccia, mentre la femmina ha filettatura dritta con faccia piana. La tenuta si ottiene dalla compressione dell'O-ring sulla faccia piana della femmina e la connessione è meccanicamente sostenuta dai filetti.

INCH SIZE	DASH	NOMINAL THREAD SIZE	MALE THREAD O.D.		FEMALE THREAD I.D.		WORKING PRESSURE		SUGGESTED TORQUE VALUES (NM)		O-RING DIMENSIONS
			mm	inch	mm	inch	bar	psi	min.	max.	
1/4"	-04	9/16" - 18	14,2	0,56	12,9	0,51	460	6670	15	18	7,65x1,78
3/8"	-06	11/16" - 16	17,3	0,68	16,0	0,63	460	6670	24	28	9,25x1,78
1/2"	-08	13/16" - 16	20,6	0,81	19,0	0,75	420	6090	43	50	12,42x1,78
5/8"	-10	1" - 14	25,4	1,00	23,6	0,93	420	6090	62	68	15,6x1,78
3/4"	-12	1.3/16" - 12	30,0	1,18	27,8	1,10	420	6090	93	100	18,77x1,78
1"	-16	1.7/16" - 12	36,6	1,44	34,5	1,36	350	5070	125	140	23,52x1,78
1.1/4"	-20	1.11/16" - 12	42,7	1,68	40,6	1,60	275	3980	170	190	29,87x1,78
1.1/2"	-24	2" - 12	50,8	2,00	48,8	1,92	210	3040	210	230	37,82x1,78

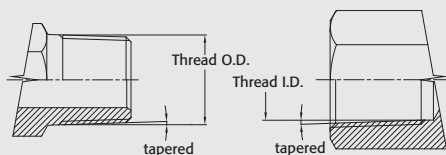
American Standard Pipe NPTF Dryseal Taper Thread SAE J476 - ANSI B1.20.3 NPSM Straight Thread ANSI B1.20.1

TERMINATION ENDS

NPTF MALE - NPSM SWIVEL FEMALE



NPTF MALE- NPTF FEMALE



NPTF and NPSM threads are American connections having a 60° angle between the flanks.

The NPTF male and female threads are tapered they have controlled truncation to assure metal to metal contact between crest and root and sealing on the thread.

The NPTF male machined with a 30° flare seat mates also with NPSM female (parallel thread). In this case the sealing is ensured on the metal to metal contact between the cones.

WARNING: Torque values need to be reduced by 50% in the NPTF/NPSM connections and by 25-30% if sealant is present.

NPTF 和 NPSM 螺纹是牙型角为 60° 的美制连接螺纹。

NPTF 外螺纹和内螺纹逐渐变细，具有受控截尾，从而确保顶部与底部之间金属与金属的连接以及螺纹密封。

加工有30°开口的 NPTF 外螺纹还可与 NPSM 内螺纹（平行螺纹）配套。这种情况下，可确保锥体之间金属与金属连接的密封。

警告：NPTF/NPSM连接的扭矩值需要减少50%，如有密封胶，则减少25%至30%。

Die NPTF- und NPSM-Gewinde sind amerikanische Verbindungen mit einem 60°-Winkel zwischen den Flanken.

Die NPTF-Außen- und Innengewinde sind konisch. Die Gewinde sind so abgetrennt, dass sie das Übermaß zwischen Spitzen und Enden und damit die Dichtheit garantieren.

Das NPTF-Außengewinde hat eine 30°-Ansenkung, um die Kopplung mit den NPSM-Innengewinden mit 30°-Kegel (zylindrisches Gewinde) zu gestalten. In diesem Fall ist die Dichtheit durch den Metallkontakt zwischen den Kegeln garantiert.

ACHTUNG: Die Anzugsmomente sind bei den NPTF/NPSM-Verbindungen um 50% und bei Vorhandensein von Dichtungsmasse um 25-30% zu vermindern.

I filetti NPTF e NPSM sono connessioni americane aventi un angolo tra i fianchi pari a 60°.

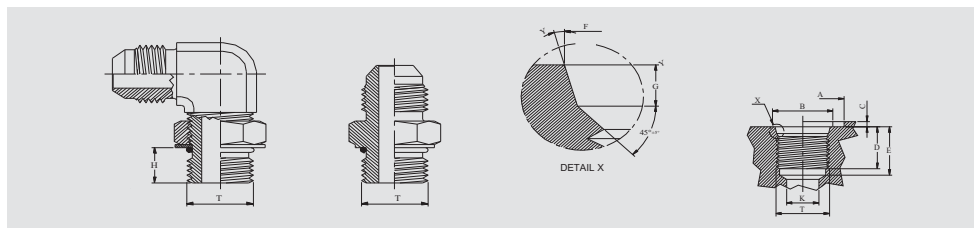
Le filettature dei maschi e delle femmine NPTF sono coniche. Le troncature dei filetti sono tali da garantire l'interferenza tra creste e fondi e quindi la tenuta.

Il maschio NPTF ha una svasatura a 30° per permettere l'accoppiamento con le femmine NPSM con cono a 30° (filettatura cilindrica). In questo caso la tenuta è garantita dal contatto metallico tra i coni.

ATTENZIONE: Le coppie di serraggio devono essere ridotte del 50% nelle connessioni NPTF/NPSM e del 25-30% in presenza di sigillante.

INCH SIZE	DASH	NOMINAL THREAD SIZE	MALE THREAD O.D.		FEMALE THREAD I.D.		WORKING PRESSURE		SUGGESTED TORQUE VALUES (NM)
			mm	inch	mm	inch	bar	psi	min.
1/8"	-02	1/8"-27	10,4	0,41	9,2	0,36	345	5000	20
1/4"	-04	1/4"-18	14,0	0,55	12,2	0,48	350	5070	30
3/8"	-06	3/8"-18	17,3	0,68	15,5	0,61	280	4060	40
1/2"	-08	1/2"-14	21,6	0,85	19,2	0,76	245	3550	55
3/4"	-12	3/4"-14	26,9	1,06	24,6	0,97	210	3040	70
1"	-16	1"-11,5	33,8	1,33	30,7	1,21	175	2530	90
1.1/4"	-20	1.1/4"-11,5	42,4	1,67	39,4	1,55	145	2100	100
1.1/2"	-24	1.1/2"-11,5	48,5	1,91	45,5	1,79	145	2100	120

PORT DIMENSIONS UNF-UN Thread Port Dimensions (SAE J475 THREAD - ISO 11926)



THREAD DIMENSIONS	7/16"-20	1/2"-20	9/16"-18	3/4"-16	7/8"-14	1.1/16"-12	1.3/16"-12	1.5/16"-12	1.5/8"-12	1.7/8"-12
T Nom.	11,11	12,7	14,29	19,05	22,23	26,99	30,16	33,34	41,27	47,62
C Max.	1,5	1,5	1,5	2,4	2,4	2,4	2,4	3	3	3
D Min.	12	12	13	15	17	20	20	20	20	20
E Min.	14	14	16	18	20	24	24	24	24	24
K Min.	5	6	7,5	10	12,5	16	18	21	27	33
A Min.	21	23	25	30	34	41	45	49	58	65
B Min.	15	16	18	22	26	32	35	38	48	54
F ± 0,05	12,45	14,05	15,70	0,65	24	29,20	32,40	35,55	43,55	49,90
G ± 0,2	2,5	2,6	2,7	2,7	2,7	3,5	3,5	3,5	3,5	3,5
Y ± 1°	12°	12°	12°	15°	15°	15°	15°	15°	15°	15°
H Ref.	9,5	9,5	10,5	12	13,5	15,5	15,5	15,5	15,5	15,5
O-ring	8,92x1,83	10,52x1,83	11,9x1,98	16,36x2,21	19,18x2,46	23,47x2,95	26,59x2,95	29,74x2,95	37,47x3,00	43,73x3,00
Assembly torque (Nm)	21	26	37	74	105	180	225	285	305	390



Sealing with O-ring.

■ If face of port is on machined surface, dimensions A and C need not apply as long as the surface requirements (Ra min 3,2) are able to avoid damage to the OR during installation. ■ C is maximum recommended spotface depth to permit sufficient wrench grip for proper tightening of the fitting or locknut. ■ Spot faced surface (dimension B) must be squared (0,2 mm) to thread in port. ■ F diameter must be concentric (0,1mm) to thread in port. ■ Surface on length G needs Ra 3,2 min in order to avoid damage on OR during installation.

O型圈密封。

- 如接触端面为机加工表面，只要在安装过程中对表面的要求 (Ra min 3,2) 能够避免损坏OR，则无需应用尺寸A和C。
- C是允许足够拧入间隙以便固定接头或螺母的最大推荐深度。
- 接触面 (尺寸B) 对端口螺纹必须达到垂直度 (0,2 mm)。
- 直径F对端口螺纹必须达到同心度 (0,1 mm)。
- 在长度G的表面粗糙度至少必须为 Ra 3,2，以避免安装过程中损坏O型圈。

Abdichtungsart mit O-Ring

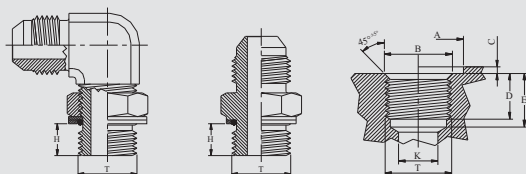
■ Falls der Anschluss maschinell bearbeitet ist, müssen die Maße A und C nicht beachtet werden solange die Oberflächenbeschaffenheit (Ra min. 3,2) eine Beschädigung des O-Rings während der Montage verhindert ■ C ist die empfohlene Maximaltiefe der Anschlussfläche für einen sicheren Halt des Gabelschlüssels am Sechskant der Mutter oder Armatur bei der Montage ■ Die Gegenfläche (Maß B) muss zum Gewinde rechtwinklig sein (0,2 mm) ■ Durchmesser F muss zum Gewinde eine Konzentrität von 0,1 mm haben ■ Die Fläche der Dichtkante G muss mindestens Ra 3,2 aufweisen, damit der O-Ring bei der Montage nicht beschädigt wird.

Tenuta con O-ring.

■ Se la superficie della porta è lavorata, i valori delle dimensioni A e C saranno definiti in modo da garantire Ra min 3.2 così da evitare danneggiamenti dell'O-ring durante l'installazione. ■ C è la profondità massima raccomandata tale da permettere il corretto serraggio del raccordo o del dado locknut. ■ La superficie B deve essere perpendicolare (0.2 mm) alla filettatura della porta. ■ La dimensione F deve essere concentrica (0.1 mm) con la filettatura della porta. ■ La superficie della lunghezza G deve garantire Ra 3.2 min per evitare danneggiamenti dell'O-ring durante il montaggio.

BSPP Thread Port Dimensions (retaining RING seat type) (ISO 1179)

PORT DIMENSIONS



THREAD DIMENSIONS	1/8"-28	1/4"-19	3/8"-19	1/2"-14	3/4"-14	1"-11	1.1/4"-11	1.1/2"-11
T Nom.	9,73	13,16	16,66	20,96	26,44	33,25	41,91	47,80
C Max.	1	1,5	2	2,5	2,5	2,5	2,5	2,5
D Min.	8	12	12	14	16	18	20	22
E Min.	3	18,5	18,5	22	24	27	29	31
A Min.	17	21	24,5	30	37	46	54	61
B +0.2/-0	9,8	13,2	16,7	21	27,1	33,3	42	47,9
H Ref.	6,5	9	9,5	11,5	13,5	15	16	16
O-ring	7,97x1,88	10,80x2,62	13,95x2,62	17,86x2,62	23,47x2,62	29,70x3,53	37,70x3,53	44x3,53
Assembly torque (Nm)	20	35	70	100	190	300	330	400



Sealing with O-ring and retaining washer.

■ If face of port is on machined surface, dimensions A and C need not apply as long as the surface requirements (Ra min 3,2) are able to avoid damage to the OR during installation. ■ C is maximum recommended spotface depth to permit sufficient wrench grip for proper tightening of the fitting or locknut. ■ Spot faced surface (dimension B) must be squared (0,2 mm) to thread in port. ■ F diameter must be concentric (0,1 mm) to thread in port.

O型圈密封和挡圈。

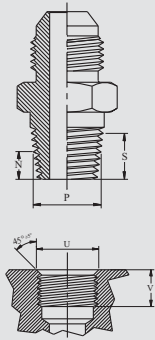
- 如接触端面为机加工表面，只要在安装过程中对表面的要求 (Ra min 3,2) 能够避免损坏，则无需应用尺寸A和C。
- C是可允许足够拧入间隙以便固定接头或螺母的最大推荐深度。
- 接触面 (尺寸B) 对端口螺纹必须达到垂直度 (0,2 mm)。■ 直径F对端口螺纹必须达到同心度 (0,1 mm)。

Abdichtungsart mit O-Ring und Unterlegscheibe.

■ Falls der Anschluss maschinell bearbeitet ist, müssen die Maße A und C nicht beachtet werden solange die Oberflächenbeschaffenheit (Ra min. 3,2) eine Beschädigung des O-Rings während der Montage verhindert ■ C ist die empfohlene Maximaltiefe der Anschlussfläche für einen sicheren Halt des Gabelschlüssels am Sechskant der Mutter oder Armatur bei der Montage ■ Die Gegenfläche (Maß B) muss zum Gewinde rechtwinklig sein (0,2 mm) ■ Durchmesser F muss zum Gewinde eine Konzentrität von 0,1 mm haben.

Tenuta con O-ring.

■ Se la superficie della porta è lavorata, i valori delle dimensioni A e C saranno definiti in modo da garantire Ra min 3.2 così da evitare danneggiamenti dell'O-ring durante l'installazione. ■ C è la profondità massima raccomandata tale da permettere il corretto serraggio del raccordo o del dado locknut. ■ La superficie B deve essere perpendicolare (0.2 mm) alla filettatura della porta. ■ La dimensione F deve essere concentrica (0.1 mm) con la filettatura della porta.



THREAD DIMENSIONS	1/8"-28	1/4"-19	3/8"-19	1/2"-14	3/4"-14	1"-11	1.1/4"-11	1.1/2"-11
T Nom.	9,73	13,16	16,66	20,96	26,44	33,25	41,91	47,80
C Max.	1	1,5	2	2,5	2,5	2,5	2,5	2,5
D Min.	8	12	12	14	16	18	20	22
E Min.	3	18,5	18,5	22	24	27	29	31
A Min.	17	21	24,5	30	37	46	54	61
B +0.2/-0	9,8	13,2	16,7	21	27,1	33,3	42	47,9
H Ref.	6,5	9	9,5	11,5	13,5	15	16	16
O-ring	7,97x1,88	10,80x2,62	13,95x2,62	17,86x2,62	23,47x2,62	29,70x3,53	37,70x3,53	44x3,53
Assembly torque (Nm)	20	35	70	100	190	300	330	400



Sealing achieved by matching female parallel thread (port) and male tapered (fitting).

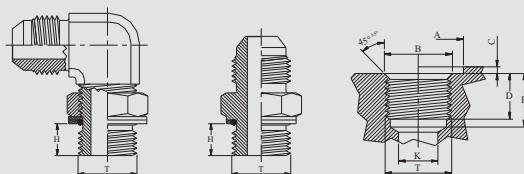
匹配锥形内螺纹和锥形外螺纹, 以达到密封的目的 (顶部变形)。

Abdichtung durch gewaltsame Verschraubung eines parallelen Gewindes (Einschraubloch) und eines konischen Außengewindes.

La tenuta si ottiene accoppiando la filettatura parallela (porta) con il maschio conico (racordo).

Metric Thread Port Dimensions (retaining RING seat type) (ISO 6149)

PORT DIMENSIONS



THREAD DIMENSIONS	10X1	12X1.5	14X1.5	16X1.5	18X1.5	20X1.5	22X1.5	26X1.5	27X2	33X2	42X2	48X2
T Nom.	10	12	14	16	18	20	22	26	27	33	42	48
C Max.	1	1,5	1,5	1,5	2	2	2,5	2,5	2,5	2,5	2,5	2,5
D Min.	8	12	12	12	12	14	14	16	16	18	20	22
E Min.	13,5	18,5	18,5	18,5	18,5	20,5	20,5	22,5	24	26	28	30
A Min.	16	20	21,5	24	27	30	32	36	37	45	55	62
B	10	12	14	16	18	20	22	26	27	33	42	48
H Ref.	8	9	9	10,5	12	12	12,5	12,5	14,5	14,5	15	17,5
O-ring	8,1x1,6	9,3x2,2	11,3x2,2	13,3x2,2	15,3x2,2	17,3x2,2	19,3x2,2	23,6x2,9	23,6x2,9	29,6x2,9	38,6x2,9	44,6x2,9
Assembly torque (Nm)	20	35	45	55	70	80	100	170	170	310	330	410



Sealing with O-ring and retaining washer.

■ If face of port is on machined surface. dimensions A and C need not apply as long as the surface requirements (Ra min 3,2) are able to avoid damage to the OR during installation. ■ C is maximum recommended spotface depth to permit sufficient wrench grip for proper tightening of the fitting or locknut. ■ Spot faced surface (dimension B) must be squared (0,2 mm) to thread in port. ■ F diameter must be concentric (0,1 mm) to thread in port.

O型圈密封和挡圈。

■ 如接触端面为机加工表面，只要在安装过程中对表面的要求 (Ra min 3,2) 能够避免损坏OR，则无需应用尺寸A和C。
 ■ C是允许足够切入间隙以便固定接头或螺母的最大推荐深度。
 ■ 接触面 (尺寸B) 对端口螺纹必须达到垂直度 (0,2 mm)。■ 直径F对端口螺纹必须达到同心度 (0,1 mm)。

Abdichtungsart mit O-Ring und Unterlegscheibe.

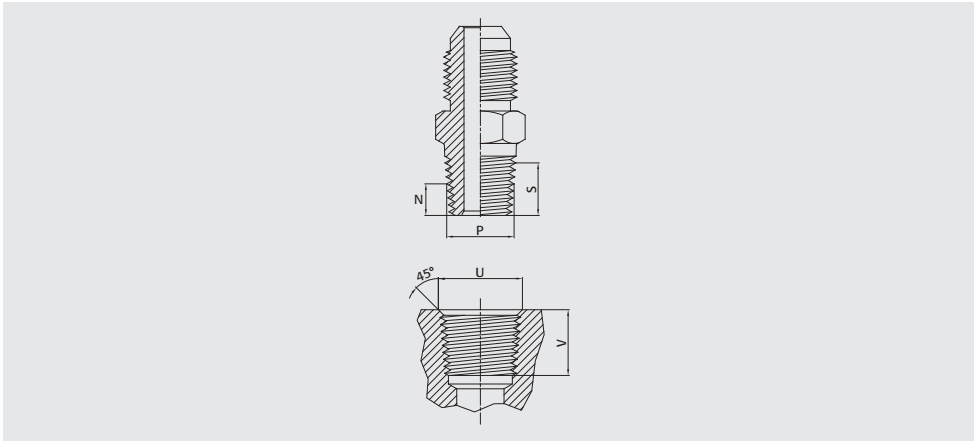
■ Falls der Anschluss maschinell bearbeitet ist, müssen die Maße A und C nicht beachtet werden solange die Oberflächenbeschaffenheit (Ra min. 3,2) eine Beschädigung des O-Rings während der Montage verhindert ■ C ist die empfohlene Maximaltiefe der Anschlussfläche für einen sicheren Halt des Gabelschlüssels am Sechskant der Mutter oder Armatur bei der Montage ■ Die Gegenfläche (Maß B) muss zum Gewinde rechtwinklig sein (0,2 mm) ■ Durchmesser F muss zum Gewinde eine Konzentrität von 0,1 mm haben.

Tenuta con O-ring.

■ Se la superficie della porta è lavorata, i valori delle dimensioni A e C saranno definiti in modo da garantire Ra min 3.2 così da evitare danneggiamenti dell'O-ring durante l'installazione. ■ C è la profondità massima raccomandata tale da permettere il corretto serraggio del raccordo o del dado locknut. ■ La superficie B deve essere perpendicolare (0.2 mm) alla filettatura della porta. ■ La dimensione F deve essere concentrica (0.1 mm) con la filettatura della porta.

PORT DIMENSIONS

NPTF Thread Port Dimensions (SAE J476 THREAD)



THREAD DIMENSIONS	1/8"-27	1/4"-18	3/8"-18	1/2"-14	3/4"-14	1"-11.5	1.1/4"-11.5	1.1/2"-11.5
V Min.	7,9	11,4	11,7	15,4	15,9	19,0	19,5	19,5
U ref.	10,2	13,5	17	21,2	26,5	33,1	41,9	48
N	4,1	5,8	6,1	8,1	8,6	10,2	10,7	10,7
P	9,5	12,5	15,9	19,8	25,1	31,5	40,2	46,3
S - Working Thread	7,6	11,6	11,8	15,4	15,7	19,6	20,2	20,6



Sealing achieved by matching female tapered thread and male tapered thread (deformation at the crest).

通过内螺纹平行螺纹 (端口) 和外螺纹锥管螺纹 (接头) 啮合进行密封。

Die Dichtheit wird durch Kopplung des konischen Innengewindes mit dem konischen Außengewinde erzielt (Deformierung des Gewindes).

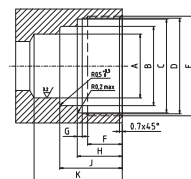
La tenuta si ottiene accoppiando la femmina conica e il maschio conico (distorsione del filetto).

The male threadless termination can be connected directly to the port, by means of pre-installed cartridge, with a simple axial pushing action of the fitting into the port.

无螺纹阳端可通过预装的夹头直接连接端口，只需沿轴向将接头推入端口即可。

Das gewindelose Steckende kann direkt am Port angeschlossen werden, mittels vorinstalliertem Steckmodul, das einfach in den Port gedrückt wird.

La terminazione senza filettature può essere connessa direttamente alla porta, se si utilizza una cartuccia pre-installata, grazie a una semplice spinta assiale del raccordo nella porta.



FEMALE PORT DESIGN

SIZE	DIMENSIONS mm					RECOMMENDED TORQUE
	A	B	C	D	E	
-04	10,03±0,08	12,75±0,1	16,55±0,07	17,0±0,1	M18x1	25-35 Nm
-06	13,03±0,08	16,9±0,2	20,55±0,07	21,0±0,1	M22x1	30-40 Nm
-08	16,03±0,08	19,9±0,2	23,55±0,07	24,0±0,1	M25x1	40-50 Nm
-12	23,03±0,08	27,9±0,2	31,05±0,07	31,5±0,1	M33x1,5	70-80 Nm

SIZE	DIMENSIONS mm					RECOMMENDED TORQUE
	F	G	H	J	K	
-04	8,5±1	1,1-0,1	10,65±0,1	14,15±0,2	19,65±0,15	25-35 Nm
-06	8,7±1	1,15-0,1	11,1±0,1	15,5±0,2	21,95±0,15	30-40 Nm
-08	8,7±1	1,25-0,1	11,3±0,1	15,7±0,2	22,15±0,15	40-50 Nm
-12	11,5±1	1,7-0,1	16,5±0,1	21,4±0,2	31,35±0,15	70-80 Nm

EASY FIT

ASSEMBLING INSTRUCTIONS

ASSEMBLING PROCEDURE

组装步骤

ZUSAMMENBAU

PROCEDURA DI ASSEMBLAGGIO



- 1** Fit the safety clip into the dedicated groove of the male fitting.

将安全夹装入外螺纹接头对应的槽。

Setzen Sie die Sicherheitsklammer in die dafür vorgesehene Nut am Stecker ein.

Sistemare la clip di sicurezza nella sede indicata del raccordo maschio.



- 3** Connect the fitting pushing into the dedicated cartridge.

将接头推入对应的夹头。

Stecken Sie den Anschluss in das entsprechende Steckmodul.

Congiungere il raccordo spingendo nella cartuccia apposita.



- 2** Use the flat headed screwdriver, or similar tool, to remove the cartridge protective cap.

用一字螺丝刀或者类似的工具拆下夹头保护盖。

Entfernen Sie den Schutzdeckel vom Steckmodul mit einem flachen Schraubenzieher oder ähnlichem.

Utilizzare la testa piatta del cacciavite, o utensile simile, per rimuovere la cartuccia dal tappo protettivo.

The fitting is correctly locked and connected, when the safety clip gets in touch with the cartridge.

当安全夹接触夹头时，接头已经正确锁定并连接。

Der Anschluss sitzt richtig, wenn die Sicherheitsklammer das Steckmodul berührt.

Il raccordo è correttamente chiuso e connesso, quando la clip di protezione entra in contatto con la cartuccia.

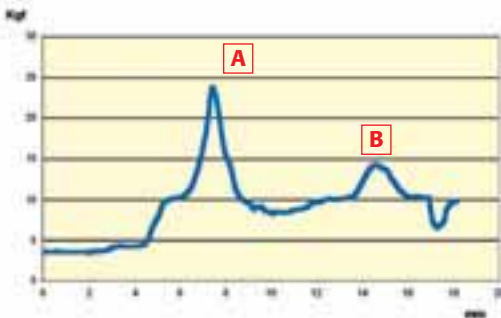
The maximum axial effort is made when the stem pass the internal retaining collars opening. The axial effort necessary to insert the fitting is not very high but not negligible. It presents a very short peak generally around the 20 kgf (ref. medium size -08). In addition, there is a second lower peak during the plastic retaining ring insertion inside the cartridge.

当杆通过内部挡环开口时，表示已经达到最大轴向力。用于插入接头的轴向力虽然不是非常大，但却不可忽略。它会产生非常短暂的峰值力，大约为20 kgf（参考中型尺寸 -08）。此外，在塑料挡圈插入夹头期间会出现第二个较小的峰值力。

Die maximale axiale Kraft erfolgt, wenn der Stiel durch die interne Rückhalteöffnung geschoben wird. Die axiale Kraft zum Eintauchen der Armatur ist nicht sehr hoch aber dennoch nicht zu unterschätzen. Die Kraft hat eine kurze Spitze bei etwa 20 kgf (Betr. mittlere Größe -08). Hinzu kommt ein zweiter, geringerer Anstrengungspunkt, wenn der Kunststoffrückhalter in das Steckmodul eingeschoben wird.

Lo sforzo assiale massimo si verifica quando la terminazione maschio attraversa l'apertura dei collarini di ritenzione. Lo sforzo assiale necessario per inserire il raccordo non è molto elevato ma nemmeno trascurabile. Presenta un picco molto breve, in genere intorno ai 20kgf (riferito a una dimensione media di -08). inoltre, è presente un secondo picco minore quando l'anello in plastica di trattenimento è inserito nella cartuccia.

ASSEMBLING PROCESS LOADS



A

Internal retaining collars opening during the stem insertion

杆插入时的内部挡环开口

Die interne Rückhalteöffnung muss sich beim Eintauchen des Stiels öffnen

Apertura del collarino interno di trattenimento durante l'inserzione della terminazione maschio

B

Plastic retaining ring insertion into cartridge

塑料挡环插入夹头

Beim Eintauchen des Plastikrings in das Steckmodul

Inserimento dell'anello in plastica di trattenimento nella cartuccia

EASY FIT

DISASSEMBLING INSTRUCTIONS

DISASSEMBLING PROCEDURE

拆卸步骤

ABBAU

PROCEDURA DI SMONTAGGIO



Before disconnection, ensure the system is not under pressure.

在断开之前, 确保系统已经释放压力。

Bevor Sie mit dem Abbau beginnen stellen Sie sicher, dass das System nicht unter Druck steht.

Prima della sconnessione, assicurarsi che il sistema non sia sotto pressione.



- 1** Use a flat headed screwdriver or similar tool, to remove the safety-clip.

用一字螺丝刀或者类似的工具拆下安全夹。

Entfernen Sie die Sicherheitsklammer mit einem flachen Schraubenzieher oder ähnlichem.

Utilizzare la testa piatta del cacciavite, o utensile simile, per rimuovere clip di sicurezza.



- 2** Push in the fitting until the collar gets in touch with the cartridge and then pull out to complete disconnection.

推动接头, 直至挡环接触夹头, 然后抽出即可完成断开操作。

Drücken Sie den Anschluss, bis der Hals das Steckmodul berührt und ziehen Sie ihn dann komplett heraus.

Spingere il raccordo finché il collarino entra in contatto con la cartuccia, quindi tirare fuori il raccordo fino a disconnessione completa.



EASY FIT

DISASSEMBLING INSTRUCTIONS

For the disassembly operation, after the initial push, a pulling effort is necessary to open the collars on the retaining ring (max. around 10 kgf).

See graphics of the axial loads (kgf) measured for the two operations, which are referred to axial advancement in mm.

在拆卸操作中, 初次施加推力之后, 必须用拉力打开挡圈上的挡环 (最大值大约为 10 Kgf)。

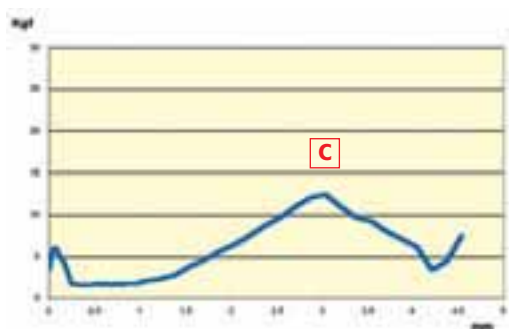
参见这两种操作中测量的轴向负载的图 (kgf) - 以轴向前进距离为横轴 (mm)。

Beim Auseinanderbauen ist nach dem ersten Drücken eine gewisse Kraft nötig, um die Hälse des Rückhalterings zu öffnen (max. etwa 10 kgf).

Siehe Grafiken der axialen Lasten (kgf), die für die beiden Arbeitsgänge gemessen wurden und die sich auf einen axialen Vor-schub in mm beziehen.

Per le operazione di smontaggio, dopo la spinta iniziale, è necessario uno sforzo di trazione per aprire il collare sull'anello di trattenimento (max 10kgf circa). Vedere il grafico dei carichi assiali (kgf) misurati per le due applicazioni, riferite all'avanza-mento assiale in mm.

DISASSEMBLING PROCESS LOADS



C

Pulling insert in the cartridge to open the collars on the retaining ring

拉夹头中的插头, 使挡圈上的挡环打开。

Beim Herausziehen des Einsatzes aus dem Steckmodul zum Öffnen des Rückhalterings

Tirando il raccordo durante il passaggio nei collarini di ritenzione

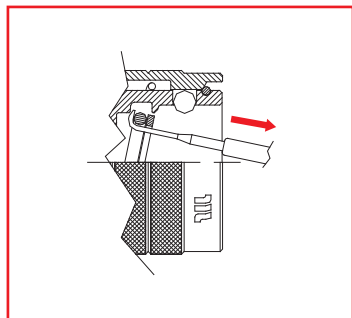
REPLACEMENT INSTRUCTIONS

O-RING AND BACK-UP RING SEAL REPLACEMENT ON FEMALE COUPLINGS

阴端耦合接头上的O型圈与支撑环密封件更换

AUSTAUSCH VON O-RING UND SICHERUNGSRING BEI KUPPLUNGSMUFFE

SOSTITUZIONE DI O-RING E BACK-UP RING SU UN INNESTO FEMMINA



1 Remove damaged O-Ring and back-up ring

拆下损坏的O型圈和支撑环

Beschädigten O-Ring und Sicherungsring entfernen

Rimuovere l'O-Ring danneggiato e il back-up ring

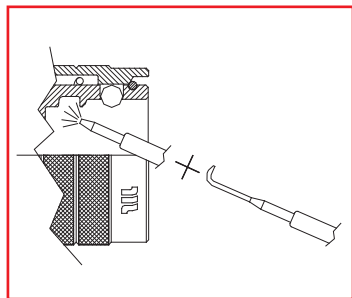


Not use sharpened tools - Take care not to damage the components

不可使用尖锐的工具 - 注意不要损坏元件

Keine scharfen Werkzeuge benutzen. - Achten Sie darauf, die Komponenten nicht zu Beschädigen

Non utilizzare utensili affilati - Attenzione a non danneggiare i componenti



2 Clean the seal area

清洁密封区域

Dichtungsbereich reinigen

Pulire l'area di posizionamento della guarnizione

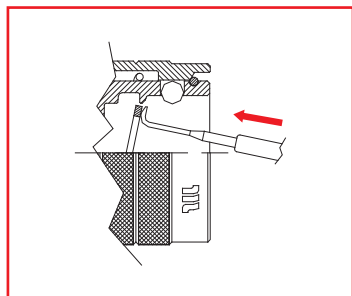


Remove all residual parts of damaged O-Ring and back-up ring

拆下剩余部分的损坏O型圈和支撑环

Entfernen Sie alle verbliebenen Teile des Beschädigten O-Rings und Sicherungsring

Rimuovere tutte le parti danneggiate dell'O-Ring e del back-up ring



3 Insert new back-up ring

插入新的支撑环

Neuen Sicherungsring einfügen

Posizionare il nuovo antiestrusione



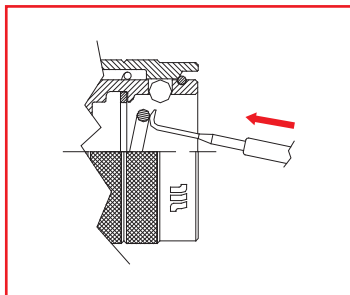
Take care not to deform or scratch back-up ring - Check the correct position on the groove

注意不要使支撑环变形或者刮伤 -

检查在槽中的位置是否正确

Achten Sie darauf, den Sicherungsring nicht zu deformieren oder anzuritzen - Prüfen Sie den korrekten Sitz in der Nut

Prestare attenzione a non deformare con graffi l'antiestrusione. Controllare la corretta posizione nella gola



4 Insert new O-Ring

插入新的O型圈

Neuen O-Ring einsetzen

Posizionare il nuovo O-Ring

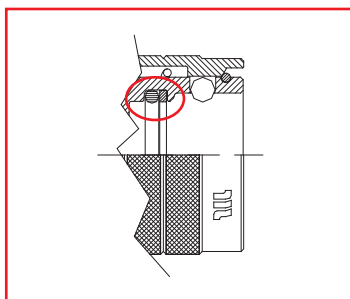


Lubricate O-Ring before insert - Take care to not scratch O-Ring - Check the correct position on the groove

在插入之前润滑O型圈 - 注意不要刮伤O型圈 - 检查在槽中的位置是否正确

O-Ring vor dem Einfügen fetten - Achten Sie darauf, den O-Ring nicht anzuritzen - Prüfen Sie den korrekten Sitz in der Nut

Lubrificare l'O-Ring prima di inserirlo - Attenzione a non graffiare l'O-Ring - Controllare la corretta posizione nella sede



5 Replacement corrected and completed

更换操作已经正确完成

Austausch auf Korrektheit geprüft un abgeschlossen

Sostituzione corretta e completata



Lubricate seal system

润滑密封系统

Dichtungssystem fetten

Lubrificare il sistema di tenuta

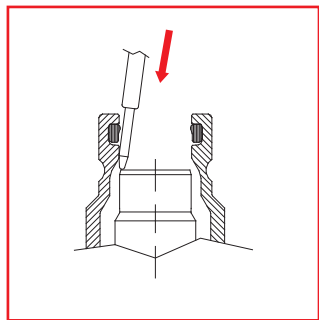
REPLACEMENT INSTRUCTIONS

POLYURETHANE SEAL REPLACEMENT ON MALE FLAT-FACE

阳端平面上的聚氨酯密封件更换

AUSTAUSCH EINER POLYURETHANDICHTUNG BEI FLACHDICHTENDEN KUPPLUNGSSTECKERN

SOSTITUZIONE DELLA GUARNIZIONE IN POLIUTERANO SU UN INNESTO MASCHIO FACCIA PIANA



1 Pull back the valve and keep back thanks to tool

用工具拉回阀门并保持该位置

Ventil mit Hilfe eines Werkzeugs öffnen und mit dem Werkzeug offen halten

Arretrare la valvola e tenerla arretrata con un utensile

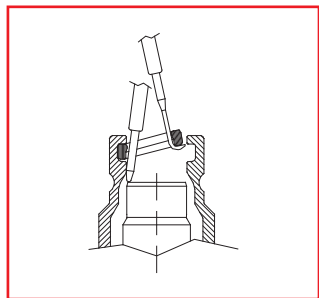


Not use sharpened tools - Take care not to damage the components

不可使用尖锐的工具 - 注意不要损坏元件

Keine scharfen Werkzeuge benutzen - Achten Sie darauf, die Komponenten nicht zu Beschädigte

Non utilizzare utensili affilati - Attenzione a non danneggiare i componenti



2 Remove damaged seal

拆下损坏的密封件

Beschädigte Dichtung entfernen

Rimuovere la guarnizione danneggiata

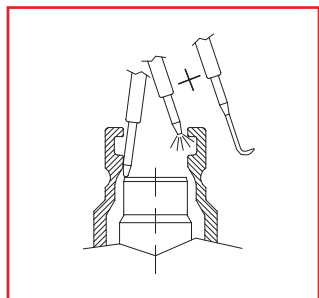


Take care not to damage the components

注意不要损坏元件

Achten Sie darauf, die Komponenten nicht zu Beschädigte

Attenzione a non danneggiare i componenti



3 Clean the seal area

清洁密封区域

Beschädigte Dichtung entfernen

Pulire l'area di posizionamento della guarnizione

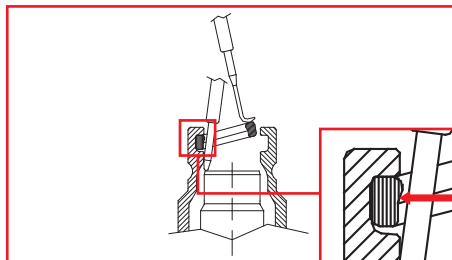


Remove all residual parts of poliurethane seal

拆下所有残留的聚氨酯密封件

Alle Beschädigten Dichtungsteile entfernen

Rimuovere tutte le parti danneggiate della guarnizione



4 Insert new seal

插入新的密封件

Neue Dichtung einsetzen

Posizionare la nuova guarnizione

Check the correct direction of seal

检查密封件的方向是否正确

Korrekte Ausrichtung der Dichtung prüfen

Controllare la corretta direzione della guarnizione

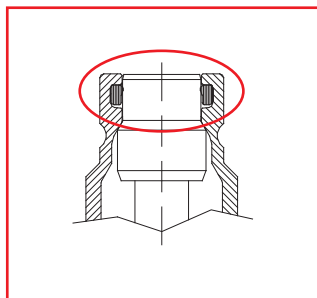


Lubricate seal before insert - Take care to not scratch seal - Ensure that seal is well arranged in its groove

在插入之前润滑密封件 - 注意不要刮伤密封件 - 确保密封件在槽中的正确位置

Dichtung vor dem Einsetzen fetten - Achten Sie darauf, die Dichtung nicht einzuritzen - Stellen Sie sicher, dass die Dichtung richtig in der Nut sitzt

Lubrificare la guarnizione prima di inserirla - Fare attenzione a non graffiare la guarnizione - Assicurarsi che la guarnizione sia correttamente posizionata



5 Release the valve. Replacement corrected and completed

松开阀门。更换操作已经正确完成

Ventil freigeben. Korrekter Austausch beendet

Rilasciare la valvola. Sostituzione corretta e completata



Lubricate seal system

润滑密封系统

Dichtungssystem fetten

Lubrificare il sistema di tenuta

REFRIMASTER AND REFRIMASTER PLUS PROCEDURE

REFRIMASTER AND REFRIMASTER PLUS WITH CLAMP

REFRIMASTER 和 REFRIMASTER PLUS 及管夹

REFRIMASTER UND REFRIMASTER PLUS MIT KLEMME

REFRIMASTER E REFRIMASTER PLUS CON FASCETTA

The fitting operations are extremely simple, and consist of the following procedures:

安装操作非常简单, 请按照以下步骤进行:

Die Herstellung eine Leitung ist extrem einfach und besteht aus folgenden Arbeitsschritten:

Il montaggio è estremamente semplice e consiste nelle seguenti operazioni:



1 Check the dimensions of the components.

检查配件尺寸。

Überprüfen Sie die Abmessungen der Komponenten.

Verificare le dimensioni dei componenti.



2 Cut the end of the hose in a perpendicular direction, using the manual cutter.

采用手动切割工具垂直切割胶管。

Schneiden Sie den Schlauch rechtwinklig zur Längsachse.

Tagliare l'estremità del tubo perpendicolarmente usando la taglierina manuale.



- 3** Verify the end of the hose to be cut in a perpendicular direction.

检查软管顶端切割是否垂直。

Prüfen Sie nochmals den Schnitt auf Rechtwinkligkeit.

Verificare che l'estremità del tubo sia tagliata perpendicolarmente all'asse del tubo.



- 4** Place the double clamp on the flexible hose in such a way that the tooth of bar A comes contact with the end of the hose that has been cut.

把双扣管夹夹在弹性软管上，金属棒A的齿部要紧贴切开的软管顶部。

Platzieren Sie die Doppelklemme so auf dem Schlauch, dass das abgewinkelte Stück des Verbindungssteiges A an der Schnittfläche des Schlauches anliegt.

Introdurre la fascetta sul tubo flessibile in modo che il dente della barretta A vada in appoggio sull'estremità del tubo tagliato.



- 5** Grease the end of the fitting joint with the same oil used in the air conditioning system.

使用与空调系统相同的润滑油润滑接口端。

Schmieren Sie das Ende der Armatur mit dem Selben Schmiermittel, das auch in der Klimaanlage verwendet wird.

Lubrificare l'estremità d'innesto del raccordo con il medesimo olio utilizzato nell'impianto di condizionamento.



- 6** Find the correct orientation and insert completely the fitting into the hose.

找出正确方位，将接头完全插入软管。

Achten Sie auf die richtige Winkelstellung und führen Sie die Armatur bis zum Anschlag in den Schlauch ein.

Trovare l'orientamento corretto e inserire completamente il raccordo nel tubo.



7 A = round nose
 圆头
 abgerundete Seite
 becco spesso

B = thin nose
 薄头
 schmale Seite
 becco sottile

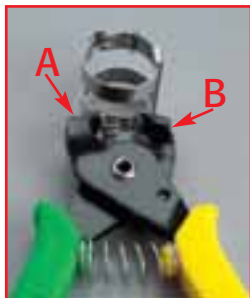
8 9 10 To place the fitting, position the round nose of the pliers (A) at the hook shaped end of the clamp and the thin nose (B) at the end with the hooked teeth. Tighten the double clamp until the click using the special "CLICK" open-close pliers. To disassemble, just reverse the position of the ends of the pliers on the clamp.

将钳子的圆头 (A) 置于管夹的钩状端, 钳子的薄头 (B) 置于钩齿端, 以便把接头固定到位。用特制 "CLICK" 开合钳夹紧双扣管夹, 听到卡擦声即可。拆卸时, 将钳子对管夹反方向操作即可。

Um die Armatur festzuklemmen, setzen Sie die abgerundete Seite der Zange (A) am hakenförmigen Ende der Klemme an und die schmale Seite der Zange (B) an dem Ende mit den Widerhaken. Schließen Sie die Doppelklemme bis diese mit einem hörbaren Klicken einrastet mit der Spezial „CLIC“ Zange. Um die Klemme zu öffnen, einfach die Position der Zange auf der Klemme umkehren.

Per il montaggio posizionare il becco arrotondato della pinza (A) all'estremità della fascetta con forma a gancio e il becco sottile (B) all'estremità con il dente d'aggancio. Serrare la fascetta fino allo scatto usando l'apposita pinza "CLIC" apri chiudi.

Per lo smontaggio è sufficiente invertire la posizione dei becchi della pinza sulla fascetta.



- 8 Closing.**
Warning:
 to close double clamp DN22 it is necessary to approach by hand the hook shaped of the clamp and the hooked teeth of the clamp.

合。

警告: 为了夹紧双扣管夹 DN22, 必须用手接近钩形管夹及其钩齿。

Schließen.

Zum Schließen der Doppelklammer DN22 müssen der Haken und der Nippel der Klammer mit der Hand angefasst werden.

Chiusura.

Attenzione:
 per la chiusura della fascetta DN22 accostare manualmente l'estremità della fascetta con forma a gancio a quella con forma a dente

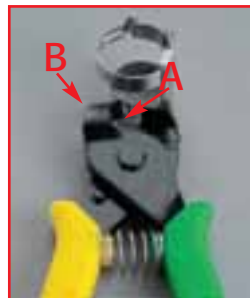


- 9 Tighting the double clamp until click to close. Reverse the position of the pliers to open.**

用特制“CLICK”开合钳加紧双扣管夹, 听到卡擦声即可。拆卸时, 将钳子对管夹反方向操作即可。

Ziehen Sie die Doppelschelle fest, bis sie einrastet. Um sie wieder zu öffnen, einfach die Greifer verdrehen.

Stringere la doppia fascetta fino allo scatto di chiusura. Per aprire voltare la posizione delle pinze.



- 10 Opening**
 开
 Öffnen
 Apertura

ASSEMBLING INSTRUCTIONS

REFRIMASTER AND REFRIMASTER PLUS PROCEDURE

WARNING: Do not reuse the clamp / 警告: 切勿重复使用夹具

HINWEIS: Verwenden Sie die Schelle nicht wieder / **AVVERTENZE:** Non riutilizzare la fascetta



11 Verify the parallelism of the two clamps.

检查确保两个管夹平行。

Stellen Sie sicher dass die Klemmen parallel sitzen.

Verificare il parallelismo delle due fascette.



12 Pay attention in tightening clamp in the right way.

注意要以正确方式紧固管夹。

Schließen Sie die Klemme korrekt.

Attenzione a chiudere correttamente la fascetta.

13 14 15 16

WARNING: Position correctly the clamp / 警告: 正确定位管夹

WARNUNG: Positionieren Sie die Klemme korrekt. / **ATTENZIONE:** Posizionare correttamente la fascetta

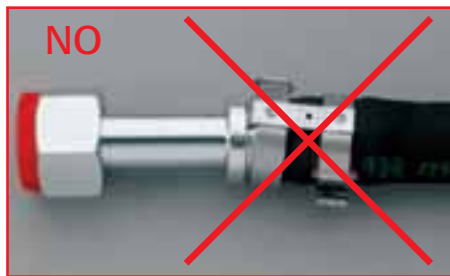


13 Right

正确

Richtig

Corretto.



14 Wrong

错误

Falsch

Errato.

Solution with brazed insert / 可使用焊接接头的方法

Anwendung mit gelöteter Armatur / Soluzione con inserto brazato.



15 Right

正确

Richtig

Corretto.



16 Wrong

错误

Falsch

Errato.

Solution with insert obtained by deformation / 可使用铸造接头的方法

Anwendung mit Armatur mit umgeformtem Rohrstutzen / Soluzione con inserto ottenuto da deformazione

REFRIMASTER AND REFRIMASTER PLUS PROCEDURE

REFRIMASTER AND REFRIMASTER PLUS MOUNTING KIT

REFRIMASTER 和 REFRIMASTER PLUS 安装工具包

REFRIMASTER UND REFRIMASTER PLUS MONTAGE KIT

REFRIMASTER E REFRIMASTER PLUS KIT DI MONTAGGIO



1 Mounting kit.

安装工具包。

Montage Kit.

Kit di montaggio.



2 Manual cutter.

手工刀具。

Schlauchschneidezange.

Taglierina manuale.



3 "CLIC" open-close pliers.

"CLIC" 开合钳。

„CLIC“ Zange.

Pinza CLIC apri-chiudi.

GB

Manuli Rubber Industries is able to supply:

- a practical mounting kit containing all tools necessary for the correct assembly of the Frigoclic[®] coupling
- the separate supply of hose in rolls, relevant fitting and complete kits according to customer specifications
- the possibility of servicing customers in all the most important countries (on the basis of minimum lot purchase order).

CN

玛努利橡胶工业公司可以提供:

- 一个实用工具包, 装有正确装配 Frigoclic[®] 接头所需的所有工具
- 根据客户要求的规格, 另行提供的卷装软管, 相关接头和完整工具包
- 可为所有最重要的国家的客户提服务 (根据最小购买量)。

D

Manuli Rubber Industries bietet folgendes:

- Das praktische Montage Kit, das alles beinhaltet was zur Verarbeitung der Frigoclic[®] Armaturen notwendig ist
- Lieferung von Schlauchmeterware und Armaturen sowie komplette Leitungen nach Kundenspezifikationen
- Direkter Service in den wichtigsten Ländern (Mindestbestellmenge).

IT

Manuli Rubber Industries è in grado di proporre:

- il pratico kit di assemblaggio contenente tutti gli utensili necessari al corretto montaggio del raccordo Frigoclic[®]
- la fornitura separata del tubo flessibile in rotoli, dei relativi raccordi e/o kit secondo le specifiche del Cliente
- la possibilità di servire i Clienti in tutti i principali Paesi (sulla base di lotti minimi d'acquisto).

REFRIMASTER AND REFRIMASTER PLUS PROCEDURE

REFRIMASTER WITH FERRULE

REFRIMASTER 及套筒

REFRIMASTER MIT FASSUNG

REFRIMASTER CON BOCCOLA



1 Check the dimensions of the components.

检查配件尺寸。

Überprüfen Sie die Abmessungen der Komponenten.

Verificare le dimensioni dei componenti.



2 Cut the end of the hose in a perpendicular direction, using the manual cutter.

采用手动切割工具垂直切割胶管。

Schneiden Sie den Schlauch rechtwinklig zur Längsachse.

Tagliare l'estremità del tubo perpendicolarmente usando la taglierina manuale.



3 Verify the end of the hose to be cut in a perpendicular direction.

检查软管顶端切割是否垂直。

Prüfen Sie nochmals den Schnitt auf Rechtwinkligkeit.

Verificare che l'estremità del tubo sia tagliata perpendicolarmente all'asse del tubo.



4 Place the ferrule on the flexible hose so that the ferrule tooth touches the end of the cut hose.

把套筒套在弹性软管上，套圈的齿部要紧贴切开的软管顶部。

Platzieren Sie die Fassung so auf dem Schlauch, dass der Steg in der Fassung an der Schnittfläche des Schlauches anliegt.

Introdurre la boccola sul tubo flessibile in modo che il dente della boccola vada in appoggio sull'estremità del tubo tagliato.



5 Grease the end of the fitting joint with the same oil used in the air conditioning system.

使用与空调系统相同的润滑油润滑接口端。

Schmieren Sie das Ende der Armatur mit dem Selben Schmiermittel, das auch in der Klimaanlage verwendet wird.

Lubrificare l'estremità del raccordo con il medesimo olio utilizzato nell'impianto di condizionamento.



6 Find the correct orientation and insert completely the fitting into the hose.

找出正确方位, 将接头完全插入软管。

Achten Sie auf die richtige Winkelstellung und führen Sie die Armatur bis zum Anschlag in den Schlauch ein.

Trovare l'orientamento corretto e inserire completamente il raccordo nel tubo.



7 Set up the crimping machine selecting the die set that is closed to the specified dimension. Crimp to the specified diameter (table a). Ensure the dies fully cover the ferrule length.

选择同胶管尺寸接近的模具设置好扣压机。扣压至规定的直径 (表 a)。要确保模具完全扣住套筒长度。

Verpressen Sie gemäß Pressmaß nach Tabelle a. Stellen Sie sicher dass die Pressbacken über die volle Länge der Fassung aufliegen.

Eeguire il set-up della pressa selezionando il set di punzoni che più si avvicina alle dimensioni specificate. Pressare al diametro specificato (tabella a). Assicurarsi che i punzoni coprano completamente la lunghezza della boccola.

REFRIMASTER AND REFRIMASTER PLUS PROCEDURE



before / 前 / vorher / prima



after / 后 / nachher / dopo

Solution with insert obtained by deformation

可使用铸造接头的方法

Anwendung mit Armatur mit umgeformtem Rohrstützen

Soluzione con inserto ottenuto da deformazione



before / 前 / vorher / prima



after / 后 / nachher / dopo

Solution with brazed insert

可使用焊接接头的方法

Anwendung mit gelöteter Armatur

Soluzione con inserto brazato



- 9** Inspect the crimping dimension using a calibrated vernier. Check the diameter at the centre of the ferrule following the values in table a.

用游标卡尺测量扣压尺寸。

根据表a的数值检查套筒中间部位直径。

Überprüfen Sie das Pressmaß mittig an der Fassung gemäß Tabelle a.

Verificare il diametro di pressatura utilizzando un calibro tarato. Controllare il diametro al centro della boccola seguendo i valori riportati in tabella a.

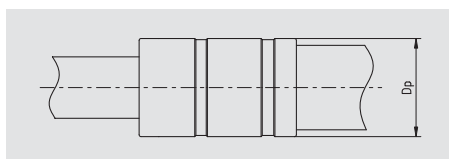


Table a / 表 a / Tabelle a / Tabella a

REFRIMASTER HOSE SIZE				Dp (± 0,1 mm)
DN	Dash	Inch	Ferrule Type	mm
8	- 06	5/16"	C00700-06	16,9
10	- 08	13/32"	C00700-08	19,9
13	- 10	1/2"	C00700-10	21,8
16	- 12	5/8"	C00700-12	26,0

REFRIMASTER PLUS HOSE SIZE				Dp (± 0,1 mm)
DN	Dash	Inch	Ferrule Type	mm
13	- 10	1/2"	C00750-10	23,2
16	- 12	5/8"	C00750-12	27,1
22	- 16	7/8"	C00750-16	35,2

- 8** Pay attention in coupling insert and ferrule.

注意接头插管和套筒。

Achten Sie auf korrekte Position von Armatur und Fassung.

Attenzione al corretto accoppiamento raccordo - boccola.

REFRISTAR WITH REUSABLE FITTINGS

REFRISTAR 重复利用接头

REFRISTAR MIT WIEDERVERWENDBAREN ARMATUREN (SCHRAUBARMATUREN)

REFRISTAR CON RACCORDI RECUPERABILI

**1** Check the dimensions of the components.

检查配件尺寸

Überprüfen Sie die Abmessungen der Komponenten.

Verificare le dimensioni dei componenti.

**4** Cut the hose by using a proper sharpened disc (see fig. 4), **do not use an abrasive disc.**

The hose must be square and clean cut.

Avoid cutting the hose not perpendicularly or cutting the hose causing damages on its wire braid (see fig. 2, 3) for a proper cutting hose operation. Clean the hose carefully from any cutting residue.

用合适的转盘刀切割软管 (见图 4), 要求刀片锋利; 切勿使用砂轮。

软管切口必须垂直且整齐。软管必须垂直切割, 应避免非垂直切割或损坏编织层 (见图 2, 图 3)。

仔细清洁软管, 清除切割残留物。

**2** Wrong cut / 错误切割 / Falscher Schnitt / Taglio scorretto.**3** Right cut / 正确切割 / Richtiger Schnitt / Taglio corretto.Tagliare il tubo utilizzando un'apposito disco ben affilato (vedi fig. 4), **non utilizzare un disco abrasivo.** Tagliare il tubo flessibile perpendicolarmente all'asse. Evitare tagli non perpendicolari e/o tagli che tendano a danneggiare la treccia metallica del tubo stesso (vedi fig. 2 e 3).

Pulire accuratamente il tubo flessibile da eventuali residui di taglio.

Schneiden Sie den Schlauch mit einem scharfen Kreismesser (siehe Abb.4), **benutzen Sie keine abrasive Scheibe.** Achten Sie auf einen geraden und sauberen Schnitt. Vermeiden Sie nicht rechtwinklige und unsaubere Schnitte (siehe Abb.2, 3). Reinigen Sie den Schlauch gründlich von Schnittrückständen. Limpie la manguera cuidadosamente de cualquier residuo del corte.

REFRISTAR PROCEDURE



- 5** Secure in position the socket i.e. by using a bench vise. Screw the hose counterclockwise into the socket until it reaches the bottom. Unscrew 1/4 turn to prevent damage in screwing.

用台式老虎钳固定管座。将软管按逆时针方向拧入管座, 直至拧到底部。旋松 1/4 圈, 防止拧动损伤。

Spannen Sie die Schraubfassung in einen Schraubstock ein. Drehen Sie den Schlauch entgegen dem Uhrzeigersinn bis zum Anschlag ein. Drehen Sie 1/4 Umdrehung zurück um Beschädigungen beim Einschrauben zu verhindern.

Fissare la boccola utilizzando per esempio una morsa. Avvitare il tubo in senso antiorario fino a toccare il fondo della boccola. Svitare il tubo di 1/4 di giro al fine di non danneggiare il tubo in fase di avvitatura.



- 6** Mark the socket and the hose using an indelible felt tip pen, to verify any absence of hose rotation inside the socket during the fittings screwing.

用不可擦除的尖头毛笔在管座和软管上作记号, 确保在配件安装拧动过程中管座内的软管不随之旋动。

Markieren Sie Schraubfassung und Schlauch um sicher zu stellen dass der Schlauch sich auf keinen Fall in der Fassung dreht, während die Armatur eingeschraubt wird.

Marcare con un pennarello indelebile la boccola ed il tubo al fine di verificare che il tubo non ruoti all'interno della boccola durante il montaggio del raccordo.



- 7** Position the hose complete with socket i.e. by using a bench vise. Grease with a lot of oil the threading and the taper of the fitting as well as the inside of hose.

WARNING: Use the same lubricant used in the A/C system.

用台式老虎钳固定软管于管座。润滑软管内部以及配件螺纹和锥体, 润滑油的用量要大。
警告: 使用和A/C系统相同的润滑油。

Spannen Sie Schlauch mit Schraubfassung im Schraubstock ein. Schmieren Sie die Schlauchinnenseite, den Konus der Armatur sowie das Gewinde großzügig.

WARNUNG: Benutzen Sie dasselbe Schmiermittel das in der Klimaanlage eingesetzt wird.

Fissare il tubo completo di boccola già montata utilizzando per esempio una morsa.

Lubrificare abbondantemente tutta la superficie della filettatura e del cono di invito del raccordo, e la superficie interna del tubo flessibile. **ATTENZIONE: Utilizzare il medesimo olio usato nell'impianto.**



- 8** Insert the fitting into the hose. Press slightly and screw by hand turning clockwise the first threads. Then by using an appropriate spanner or a screw-spanner on the hexagon, screw the fitting into the socket with a continuous and constant rotation motion and verify any absence of hose rotation inside the socket during the fitting screwing. Complete the screwing until the fitting reaches the bottom against the socket. Never overtighten. Assembling is now finished.

将配件装入软管。先轻轻按住并按顺时针方向用手拧动。然后用一个合适的扳手或用六角扳手把配件拧入管座，不要中途停顿。拧动配件时，确保软管不在管座中随之旋转。配件拧至管座底部即可。切勿拧动过紧 完成组装。

Führen Sie die Armatur in den Schlauch ein und drehen Sie unter leichtem Druck die ersten Gewindegänge von Hand ein. Benutzen Sie nun einen passenden Schraubenschlüssel und führen Sie die Montage möglichst gleichmäßig und ohne Unterbrechungen bis zum Anschlag fort. Achten Sie dabei unbedingt darauf, dass sich der Schlauch nicht in der Fassung mitdreht. Gewinde nicht überdrehen. Die Montage ist damit abgeschlossen.

Inserire il raccordo nel tubo. Avvitare a mano in senso orario i primi filetti del raccordo, esercitando una certa pressione con l'ausilio di una chiave esagonale. Avvitare e procedere con movimento rotatorio costante e continuo e verificare che il tubo non ruoti all'interno della boccola durante il montaggio del raccordo. Avvitare completamente il raccordo fino ad ottenere un leggero contatto tra la boccola ed il raccordo stesso. Non forzare mai il serraggio. L'assemblaggio risulta così effettuato.



- 9** You can leave a margin of max 3 mm between the hexagon of the fitting and the socket. Verify alignment.

六角接头与管座之间允许留有最大 3 毫米的空当。检验是否平直。

Um den Winkel der Armatur korrekt einzustellen ist es zulässig bis zu 3mm Luft zwischen der Schraubfassung und dem Sechskant auf der Armatur zu lassen.

È accettabile una distanza massima di 3 mm fra la chiave del raccordo e la boccola. Verificare allineamento.

REFRISTAR PROCEDURE

REFRISTAR WITH CRIMPED FITTINGS

REFRISTAR 扣压接头

REFRISTAR MIT PRESSARMATUREN

REFRISTAR CON BOCCOLA A CRIMPARE



1 Check the dimensions of the components.

检查配件尺寸。

Überprüfen Sie die Abmessungen der Komponenten.

Verificare le dimensioni dei componenti.



4 Cut the hose by using a proper sharpened disc (see fig. 4), **do not use an abrasive disc**. The hose must be square and clean cut. Avoid cutting the hose not perpendicularly or cutting the hose causing damages on its wire braid (see fig. 2, 3) for a proper cutting hose operation. Clean the hose carefully from any cutting residue.

用合适的转盘刀切割软管 (见图 4), 要求刀片锋利; 切勿使用砂轮。



2 Wrong cut / 错误切割 / Falscher Schnitt / Taglio scorretto.



3 Right cut / 正确切割 / Richtiger Schnitt / Taglio corretto.

软管必须垂直切割, 应避免非垂直切割或损坏编织线 (见图 2, 图 3)。仔细清洁软管, 清除切割残留物。

Schneiden Sie den Schlauch mit einem scharfen Kreismesser (siehe Abb. 4), **benutzen Sie keine abrasive Scheibe**. Achten Sie auf einen geraden und sauberen Schnitt. Vermeiden Sie nicht rechtwinklige und unsaubere Schnitte (siehe Abb. 2, 3). Reinigen Sie den Schlauch gründlich von Schnittrückständen.

Tagliare il tubo utilizzando un apposito disco ben affilato (vedi fig. 4), **non utilizzare un disco abrasivo**. Tagliare il tubo flessibile perpendicolarmente all'asse. Evitare tagli non perpendicolari e/o tagli che tendano a danneggiare la treccia metallica del tubo stesso (vedi figg. 2 e 3). Pulire accuratamente il tubo flessibile da eventuali residui di taglio.



- 5** Place the ferrule on the flexible hose so that the ferrule tooth touches the end of the cut hose.

把套筒套在弹性软管上，
套筒的齿部要紧贴切开的软管顶部。

Platzieren Sie die Fassung so auf dem Schlauch, dass der Steg in der Fassung an der Schnittfläche des Schlauches anliegt.

Introdurre la boccola sul tubo flessibile in modo che il dente vada in appoggio sull'estremità del tubo tagliato.



- 6** Grease the end of the fitting joint with the same oil used in the air conditioning system.

使用与空调系统相同的润滑油润滑接口端。

Schmieren Sie das Ende der Armatur mit dem Selben Schmiermittel, das auch in der Klimaanlage verwendet wird.

Lubrificare l'estremità d'innesto del raccordo con il medesimo olio utilizzato nell'impianto di condizionamento.



- 7** Find the correct orientation and insert completely the fitting into the hose.

找出正确方位，将接头完全插入软管。

Achten Sie auf die richtige Winkelstellung und führen Sie die Armatur bis zum Anschlag in den Schlauch ein.

Trovare l'orientamento corretto e inserire completamente il raccordo nel tubo.

REFRISTAR PROCEDURE



- 8** Set up the crimping machine selecting the die set that is closed to the specified dimension. Crimp to the specified diameter. Ensure the dies fully cover the ferrule length.

选择同胶管尺寸接近的模具设置好扣压机。扣压至规定的直径。要确保模具完全扣住套筒长度。

Verpressen Sie gemäß Pressmaß. Stellen Sie sicher dass die Pressbacken über die volle Länge der Fassung aufliegen.

Eseguire il set-up della pressa selezionando il set di punzoni che più si avvicina alle dimensioni specificate. Pressare al diametro specificato. Assicurarsi che i punzoni coprano completamente la lunghezza della boccola.



- 9** Inspect the crimping dimension using a calibrated vernier. Check the diameter at the centre of the ferrule following the values on the table b.

用游标卡尺测量扣压尺寸。根据表b的数值检查套筒中心部位直径。

Überprüfen Sie das Pressmaß mittig an der Fassung gemäß Tabelle b.

Verificare il diametro di pressatura utilizzando un calibro tarato. Controllare il diametro al centro della boccola seguendo i valori riportati in tabella b.

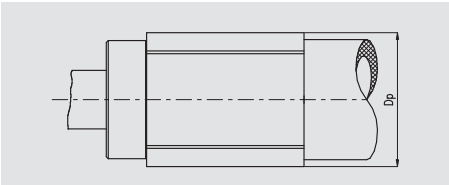


Table b / 表b / Tabelle b / Tabella b

HOSE SIZE			Dp (± 0,1 mm)
DN	Dash	Inch	mm
5	- 04	3/16"	15,2
8	- 06	5/16"	20,2
10	- 08	13/32"	21,3
13	- 10	1/2"	26,0
16	- 12	5/8"	30,8
22	- 16	7/8"	34,4
28	- 20	1.1/8"	42,5

REFRIFAST WITH ONE-PIECE CRIMPED FITTINGS

REFRIFAST 整体式扣压接头

REFRIFAST MIT EINTEILIGEN ARMATUREN

REFRIFAST CON RACCORDI ONE-PIECE

The fitting operations are extremely simple, and consist of the following procedures:

安装操作非常简单, 请按照以下步骤进行:

Die Herstellung eine Leitung ist extrem einfach und besteht aus folgenden Arbeitsschritten:

Il montaggio è estremamente semplice e consiste nelle seguenti operazioni:

**1 Check the dimensions of the components.**

检查配件尺寸。

Überprüfen Sie die Abmessungen der Komponenten.

Verificare le dimensioni dei componenti.

**2 Cut the end of the hose in a perpendicular direction, using the manual cutter.**

采用手动切割工具垂直切割胶管。

Schneiden Sie den Schlauch rechtwinklig zur Längsachse.

Tagliare l'estremità del tubo perpendicolarmente usando la taglierina manuale.

**3 Verify the end of the hose to be cut in a perpendicular direction.**

检查软管顶端切割是否垂直。

Prüfen Sie nochmals den Schnitt auf Rechtwinkligkeit.

Verificare che l'estremità del tubo sia tagliata perpendicolarmente all'asse del tubo.

REFRISTAR PROCEDURE



- 4** Grease the end of the fitting joint with the same oil used in the air conditioning system.

使用与空调系统相同的润滑油润滑接口端。

Schmieren Sie das Ende der Armatur mit dem Selben Schmiermittel, das auch in der Klimaanlage verwendet wird.

Lubrificare l'estremità del raccordo con il medesimo olio utilizzato nell'impianto di condizionamento.



- 5** Find the correct orientation and insert completely the fitting into the hose.

找出正确方位, 将接头完全插入软管。

Achten Sie auf die richtige Winkelstellung und führen Sie die Armatur bis zum Anschlag in den Schlauch ein.

Trovare l'orientamento corretto e inserire completamente il raccordo nel tubo.



- 6** Check the correct position of the hose through the proper hole in the ferrule.

通过套筒上的相应孔确认胶管位置是否正确。

Überprüfen Sie die korrekte Position des Schlauches mittels des dazu vorgesehenen Lochs in der Fassung.

Verificare la posizione corretta del tubo attraverso l'apposito foro nella boccaola.



- 7** Set up the crimping machine selecting the die set that is closed to the dimension specified diameter. Place the fitting on the proper positioner to ensure that it is in the correct position (table c).

选择同胶管直径接近的模具设置好扣压机。将接头置入适当的定位器, 以保证将接头放置在正确位置(表c)。

Verpressen Sie gemäß Pressmaß nach Tabelle c. Stellen Sie sicher dass die Pressbacken über die volle Länge der Fassung aufliegen.

Eseguire il set-up della pressa selezionando il set di punzoni che più si avvicina alle dimensioni specificate. Pressare al diametro specificato (tabella c). Assicurarsi che i punzoni coprano completamente la lunghezza della boccaola.



- 8** Inspect the crimping dimension using the proper calibrated vernier (see picture). Check the dimensions following the values in table c.

使用合适的游标卡尺检测扣压尺寸 (参见图)。
按照表c中的值检查尺寸。

Überprüfen Sie das Pressmaß mittig an der Fassung gemäß Tabelle c.

Verificare il diametro di pressatura utilizzando un appropriato calibro tarato (v. immagine). Controllare il diametro al centro della boccola seguendo i valori riportati in tabella c.

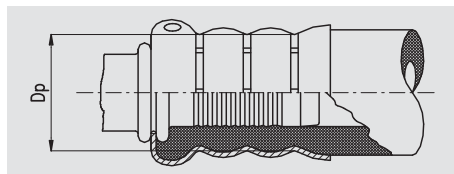


Table c / 表c / Tabelle c / Tabella c

HOSE SIZE			Dp (± 0,2 mm)
DN	Dash	Inch	mm
8	- 06	5/16"	14,8
10	- 08	13/32"	16,3
13	- 10	1/2"	18,8
16	- 12	5/8"	21,1

PART NUMBERING SYSTEM

HOSES



DIGIT "0"
"H" letter always means Hoses



DIGIT "1-2-3-4-5"
Family
"Five digits number" that defines different Families.
More details in the table "Hose Families".



DIGIT "6"
Progressive letter (A, B, ...) is used to identify an updated structure
In case a number is used, it must be read together with digit "7" and "8" to identify the hose's diameter in mm



DIGIT "7-8"
Diameter in millimetres
In case digit "6" is a number, the hose's diameter in mm must be read including it



DIGIT "9-10-11-12"
These digits define marking technology, package type and other specific features.



PART NUMBERING SYSTEM

HOSE FAMILIES

CODE FAMILY

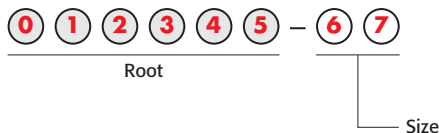
01A32 SHIELDMASTER/6000
01A78 SUPERJET/PLUS
01A79 SUPERJET/PLUS BLUE
01A94 PROJET
01A95 PROJET BLUE
01006 TRACTOR/1T
01007 ROCKMASTER/1SN
01013 TRACTOR/1K
01015 PILOT
01025 TRACTOR/2K
01027 TRACTOR/2T
01030 ROCKMASTER/2SC
01031 SHIELDMASTER/4000
01032 SHIELDMASTER/5000
01033 CPH/2SC
01034 JACKMASTER
01035 ROCKMASTER/2ST
01038 ROCKMASTER/2SN
01039 NOZONE/2K
01056 HARVESTER/17
01058 EQUATOR/1 (BLACK)
01059 EQUATOR/1 (BLUE)
01060 EQUATOR/2 (BLACK)
01061 EQUATOR/2 (BLUE)
01084 LYTE-FLEX
01101 ROCKMASTER/2 PLUS
01102 ETERNITY/2
01104 SHIELDMASTER/5000 MINE
01106 SHIELDMASTER/2000
01108 ROCKMASTER/1SC
01110 REFRISTAR
01112 TWINPOWER/PLUS
01119 TWINPOWER/4000
01120 TWINPOWER/5000
01122 SHIELDMASTER/2 PLUS MINE
01124 FIREND
01125 GOLDENISO/21 ANTIWEAR
01126 GOLDENISO/28 ANTIWEAR
02001 SUPERJET
02002 SUPERJET BLUE
02003 K-JET
02004 TRACTOR/1T
02008 K-JET BLUE
05002 COVER
09002 REFRIMASTER
09045 ASTRO/2
09046 ASTRO/3
09066 PUSHFIT
09067 MULTITEX
09068 REFRIFAST
09071 REFRIMASTER PLUS

CODE FAMILY

10008 ROCKMASTER/4SP
10009 GOLDENSPIR/4SP
10016 XTRAFLEX/5000
10018 DIAMONDSPIR
10031 ROCKMASTER/12
10035 ROCKMASTER/13
10040 GOLDENSPIR/4SH
10044 ROCKMASTER/4SH
10049 ROCKMASTER/15
10065 XTRAFLEX/4000
10066 GOLDENBLAST/PLUS
10067 GOLDENBLAST/SIX
10072 GOLDENBLAST
10078 XTRAFLEX/6000
10086 SHIELDMASTER/6000 MINE
10089 GOLDENISO/45 LONG LIFE
10091 GOLDENMINE
11001 GOLDENDRILL/3000
11002 GOLDENDRILL/4000
11003 GOLDENDRILL/5000
11004 GOLDENDRILL/7500
30005 SPIRTEX/K
30010 HYDROPLAST
30011 HYDROTWIN

PART NUMBERING SYSTEM

FERRULES AND CLAMPS



DIGIT "0"

- M Ferrule MF2000
- C Ferrule or clamp for refrigeration
- K Reusable Ferrule



DIGIT "1"

- 0 Always



DIGIT "2 - 3"

Ferrule family

- 01 Skive Ferrule for W.B Hoses
- 03 No-Skive Ferrule for Textile Braided Hoses / Star-Crimp Ferrule for RefriStar
- 04 Reusable Star-Fit Ferrule for RefriStar
- 07 Frigoclic Ferrule for Refrimaster and Refrimaster Plus
- 08 No-Skive Ferrule for Compact Hoses
- 09 Skive Ferrule for W.B and W.S Hoses
- 10 Frigoclic Clamp for Refrimaster and Refrimaster Plus
- 15 Double Skive Ferrule for H.D. Spiral Hoses (Interlock Plus 4 ply)
- 16 Double Skive Ferrule for H.D. Spiral Hoses (Interlock Plus 6 ply)
- 17 Double Skive Ferrule for Extra Duty Spiral Hoses (Blastlock-Xtralock 4 ply)
- 18 Double Skive Ferrule for Extra Duty Spiral Hoses (Blastlock-Xtralock 6 ply)
- 31 No-Skive Ferrule for 1W.B. Hoses
- 34 No-Skive Ferrule for W.B. Hoses



DIGIT "4"

- 0 Ferrule series release 00
- 1 Ferrule series release 01
- 2 Ferrule series release 02
- 3 Ferrule series release 03



DIGIT "5"

- 0 Always



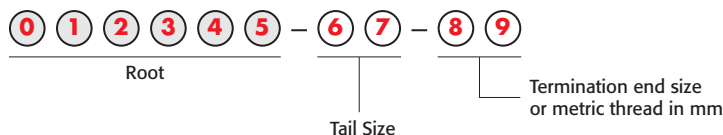
DIGIT "6-7"

Hose bore size



PART NUMBERING SYSTEM

TWO PIECES HYDRAULIC FITTINGS



DIGIT "0"

- M MF2000 connector (Multifit, Interlock Plus, Xtralock, ...)
 O Accessories (banjo, flange clamps, bolt,...)
 L Push-lock connector



DIGIT "1"

- 1 Male or double connectors, type Multifit
 2 Female or flange, type Multifit
 3 Male or double connectors, type Interlock Plus
 4 Female or flange, type Interlock Plus
 5 Male or double connectors, type Xtralock
 6 Female or flange, type Xtralock
 8 Accessories (flange, clamps, bolt)



DIGIT "2"- "3"

The numbers stated in these positions refer to the termination end or to the second tail.
 For the coding, see table "Termination Ends Type".



DIGIT "4"

This digit specifies the bending angle or the configuration

- | | | | |
|---|-----------------------|---|---------------------------|
| 0 | Special Bending Angle | 5 | straight double connector |
| 1 | Straight | 6 | 60° Swept |
| 2 | 22,5° Swept | 7 | 67,5° Swept |
| 3 | 30° Swept | 8 | Compact type |
| 4 | 45° Swept | 9 | 90° Swept |



DIGIT "5"

- 0 No Nut / Male / Flange type Xtralock/Multispiral/Interlock Plus
 1 Crimped-back Nut or Flange type Multifit
 2 Thrust-wire Nut
 3 Slip-on Nut
 7 One piece flange clamp (only for 08... codes)
 8 ISO/SAE code 61 split flange clamp (only for 08... codes)
 9 ISO/SAE code 62 split flange clamp (only for 08... codes)



DIGIT "6-7"

These digits specify the tail size



DIGIT "8-9"

These digits specify the termination end size or metric thread in mm



PART NUMBERING SYSTEM

TERMINATION ENDS TYPE

Digit	MF2000	MF4000	Q.Safe	Refri	Description (male end)	Description (female end)
00	00			00	Double connector / No end (plug)	No end (plug)
02		02			BSP Male Tapered Thread Long	BSP Female Tapered
03	03	03			BSP Male Parallel Thread O'Ring Flat Face (ISO 1179-3)	BSP Banjo
04		04	04		BSP Male Bulkhead	BSP Fixed Female DIN 3852-2 "form X" / ISO 1179-1
05	05	05	05		BSP Male 60° cone seat BS5200 / ISO 8434-6	BSP Female 60° cone BS5200 / ISO 8434-6
06	06	06			BSP Male Flat Face	BSP Female Flat seat
07	07	07			BSPT Male	JIS B 8363 (Nissan) Swivel Female
08	08					BSP O-Ring Female 60° cone BS5200 / ISO 8434-6
09	09	09			BSP Male O'Ring Boss Adjustable ISO 1179-3	Metric Banjo DIN 7642
10	10				Metric male 60° cone superlight DIN 3863	Metric female 60° cone superlight DIN 3863
11	11		11	11	Metric male 24° cone seat light type DIN 3861 / ISO 8434-1	
12	12		12		Metric male 24° cone seat heavy type DIN 3861 / ISO 8434-1	Metric Female 24° cone O'Ring heavy type DIN 3865 / ISO 8434-2 Long Drop
13	13					Metric Female Multiseal cone DIN 3868
14			14		Metric Male DIN 3852-11 "form E" b/ ISO 9974-2	Metric Fixed Female DIN 3852-1 "form X" and "form Y"
15	15			15		Metric Female 24° cone O'Ring light type DIN 3865 / ISO 8434-1
16	16					Metric Female 24° cone O'Ring heavy type DIN 3865 / ISO 8434-2
17	17				French Millimetric metric male 24° cone seat	French Millimetric metric female
18	18				French GAZ metric male 24° cone seat	French GAZ metric female
19		19	19		Metric Male (Adjustable + Non-Adjustable Heavy) ISO 6149-2	Metric Fixed Female ISO 6149-1
20	20					DIN Metric Standpipe L.T. DIN 2353
21	21					DIN Metric Standpipe H.T. DIN 2353
22		22			JIC male Long 37° cone SAE J514	
23		23	23		JIC Bulkhead male 37° cone ISO 8434-2 / SAE J514	
24	24	24	24	24	ORFS male ISO 8434-3 / SAE J1453	ORFS female ISO 8434-3 / SAE J1453
25	25	25	25	25	JIC male (37° cone) ISO 8434-2 / SAE J514	JIC female (37° cone seat) ISO 8434-2 / SAE J514
26	26			26		SAE female (45° cone seat) SAE J512
27	27	27			ORFS Bulkhead male ISO 8434-3 / SAE J1453	JIC female double hexagon 37° cone seat
28	28	28	28		NPTF Male 60° cone seat SAE J476a	NPSM Swivel Female 60° cone SAE J514
29		29			ORFS male type Long SAE J1453	
30	30	30	30		Male O'Ring Boss type SAE J1926-3	Female Port SAE J1926-1
31		31			Male O'Ring Boss Adjustable Light SAE J1926-3	
33	33					Flange ISO/SAE 61 (ISO 6162-1 / SAE J518 code 61)
34	34	34	34		API Male	NPTF Fixed Female SAE J476a
35	35				NPT Male	NPT Fixed Female
36	36					Flange ISO/SAE 62 (ISO 6162-2 / SAE J518 code 62)
37	37		37	37	Metric male 60° cone superlight DIN 3863 Bulkhead	Flange ISO/SAE 62 Plus / Flange (A/C)
38	38					JIS B 8363 (Toyota) Swivel Female
39	39					SUPERCAT flange
40	40					JIS B 8363 (Komatsu) Swivel Female
41	41				NPTF Swivel Male SAE J476a	Komatsu Flange
43	43				SAE O'Ring Boss Swivel Male	
44	44	44			Male BSPP Flat Face Bonded Washer	ORFS Female Long Drop Elbow ISO 12151-1 / SAE J516
46	46	46			Super Staple Male	Super Staple Fixed Female
47	47				Super Staple Male (only for Interlock Plus)	JIC (37° cone) Female Long Drop Elbow ISO 12151-5 / SAE J516
48	48	48			Staple Male SAE J1467	Staple Fixed Female SAE J1467

PART NUMBERING SYSTEM

TERMINATION ENDS TYPE

Digit	MF2000	MF4000	Q.Safe	Refri	Description (male end)	Description (female end)
49	49					Wash Cleaning
59	59	59			Flushfit Male Low Pressure	Flushfit Fixed Female Low Pressure
61	61				Flushfit Male High Pressure	Flushfit Fixed Female High Pressure
62		62				Flushfit Swivel Female Low Pressure
64		64			BSP Male front seal	Flushfit Swivel Female High Pressure
66	66					Metric Female 24° cone O'Ring heavy type DIN 3865 / ISO 8434-2 (only for Blastlock / Xtralock)
72		72				SuperStaple Lock Swivel Female
76				76		Expansion valve (A/C)
77			77		DIN Bulkhead Male 24° cone Light type ISO 8434-1	
78	78				NPTF Male 60° cone seat SAE J476a (only for Interlock Blastlock/Xtralock)	
79				79	Fixed Male O'Ring seat (A/C)	Female O'Ring (A/C)
80				80	Male Swivel O'Ring (A/C)	
82		82	82		French GAZ Bulkhead metric male 24° cone seat	Staple Lock Swivel Female
85	85					XtraFlange (ISO 6162-2 / SAE J518 code 62 port compatible)
86	86					Flange ISO/SAE 62 (ISO 6162-2 / SAE J518 code 62) - only for Xtralock
87		87			DIN Bulkhead Male 24° cone Heavy type ISO 8434-1	
95	95					Brazing socket

Digit	MF2000	MF4000	Q.Safe	Refri	Easy-Fit
2H	2H				Easy-Fit High Pressure (Cejn)

Digit	MF2000	MF4000	Q.Safe	Refri	Accessories for connectors (08...)
33	33				Clamps for flange ISO/SAE 61
36	36				Clamps for flange ISO/SAE 62
85	85				Xtraflange Clamps
02	02				BSP Bolt
03	08				BSP Bolt Double Hole
08	08				Metric Bolt DIN 7643
2H	2H				Cartridge for Easy-Fit High Pressure

PART NUMBERING SYSTEM

ADAPTORS



DIGIT "0"

A Adaptors



DIGIT "1"

The numbers stated in this position refer to the ends number

4 One End / Accessories

5 Two Ends

7 Three Ends

9 Four Ends



DIGIT "2"

The numbers stated in this position refer to the gender and geometry of the ends

One End / Accessoires

0 Male plug

1 Female plug

2 Sleeve

3 Nut

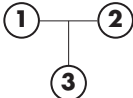


Two Ends

	1st end	2nd end	geometry
0	male	male	straight
1	female	female	straight
2	male	female	straight
3	male	male	45° elbow
4	female	female	45° elbow
5	male	female	45° elbow
6	male	male	90° elbow
7	female	female	90° elbow
8	male	female	90° elbow

Three ends

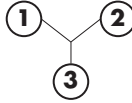
	1st end	2nd end	3rd end
0	male	male	male
1	male	male	female
2	male	female	male
3	female	female	female
4	female	female	male
5	female	male	female
6	male 1	male 2	male 1
7	female 1	female 2	female 1
8	male 1	male 1	male 2
9	female 1	female 1	female 2



PART NUMBERING SYSTEM

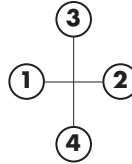
ADAPTORS

	1st end	2nd end	3rd end
Y	female	female	female



Four ends

	1st end	2nd end	3rd end	4rd end
0	male	male	male	male
1	male 1	male 1	male 1	male 2
2	male 1	male 2	male 1	male 2
3	male	male	male	female
4	male	female	male	female
5	male	female	female	female
6	female	female	female	female
7	female 1	female 1	female 1	female 2
8	female 1	female 2	female 1	female 2
9	male	male	female	female



DIGIT "3"- "4"



The numbers stated in these positions indicate the first end (see table "Termination Ends Type").

When male and female ends are present, the male is always the first end.

When all the ends are male or female, one end takes priority respect to the other one following the tables "Priority of the Ends".

DIGIT "5"- "6"



The numbers stated in these positions indicate the second end (see table "Termination Ends Type").

DIGIT "7"- "8" AND "9"- "10"



When the ends are part of the same family, the first size is the smallest.

The size sequence is the same of the ends sequence (the first size indicates the first end, the second size indicates the second end).

Special adaptors (3-ways adaptors)

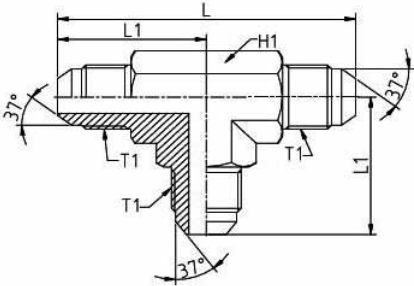
When two ends are part of the same family, the family is indicated only one time.

PART NUMBERING SYSTEM

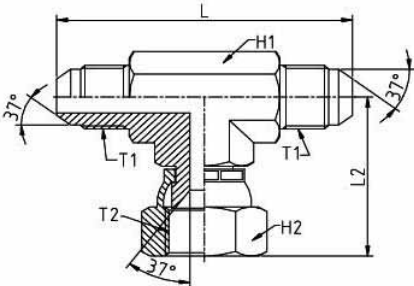
ADAPTORS

TYPICAL CONFIGURATIONS FOR 3-WAYS ADAPTORS

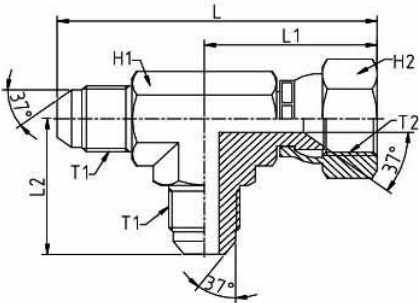
UNION TEE



BRANCH TEE



RUN TEE



PART NUMBERING SYSTEM

PRIORITY OF THE ENDS

The top-down list in each family follows this order:

- 1) Standard Male
- 2) Bulkhead Male
- 3) Male for Port
- 4) Female (when digits are different from the male)

ORFS

- 24 ORFS type
- 29 ORFS type Long

JIC

- 25 JIC Thread (37° cone)
- 23 JIC Thread (37° cone) Bulkhead
- 22 JIC Thread (37° cone) Long

BSP

- 05 BSP Parallel Thread (60° cone)
- 07 BSP Male Tapered Thread
- 04 BSP Bulkhead / BSP Female Fixed
- 02 BSP Tapered Thread Long
- 03 BSP Parallel Thread O'R Flat Face
- 09 BSP Parallel Thread O'R Flat Face Adjustable

SAE

- 30 SAE O'Ring Boss Thread
- 31 SAE O'Ring Boss Thread (Adjustable Light)

NPTF

- 28 NPTF Male / NPSM Female Thread
- 34 NPTF Fixed Female

METRIC ENDS

- 19 Metric Thread ISO 6149

MINING

- 48 Staple Male / Staple Fixed Female
- 46 Super Staple Male / Super Staple Fixed Female
- 59 Flushfit Male / Flushfit Fixed Female Low Pressure
- 61 Flushfit Male / Flushfit Fixed Female High Pressure
- 82 Swivel Female Staple Lock Connection
- 72 Swivel Female Super Staple Lock Connection
- 62 Swivel Female FlushFit Connection Low Pressure
- 64 Swivel Female Flushfit Connection High Pressure

PART NUMBERING SYSTEM

HYDRAULIC QUICK COUPLINGS

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

Root

DIGIT "0"

Q Quick Coupling

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

DIGIT "1"

0 Hydraulic

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

DIGIT "2-3"

Quick Coupling Series. Refer to the table "Hydraulic Quick Coupling Series".

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

DIGIT "4"

The number stated in this position indicates the material:

- 1 STEEL
- 2 AISI 316
- 3 AISI 303
- 4 BRASS
- 5 ALUMINIUM

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

DIGIT "5"

The number stated in this position indicates the seals material:

- 0 Absence
- 1 NBR (nitrile)
- 2 HNBR
- 3 FKM (viton, FPM)
- 4 CR (neoprene)
- 5 EPDM
- 6 FFPM (Kalrez)
- 7 NBR (Nitrile Low Temperature)
- 8 VMQ (silicone rubber)
- 9 AU (polyurethane)

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

DIGIT "6"- "7"

The numbers stated in this positions indicate the end configuration according to the "Termination Ends Type" table.

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

DIGIT "8"

The numbers stated in this position indicate the Thread Gender:

- 0 Male
- 1 Female

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

DIGIT "9"

A letter stated in this position identifies a customized version.

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

DIGIT "10"- "11"

The numbers stated in this position indicate the quick coupling size.

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

DIGIT "12"- "13"

The numbers stated in this position indicate the thread size.

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

PART NUMBERING SYSTEM

PLUG/SEAL (HYDRAULIC QUICK COUPLING)

0
1
2
3
4
5
6
7
 –
 8
9
10

Root

DIGIT "0"

Q Quick Coupling

0
1
2
3
4
5
6
7
 –
 8
9
10

DIGIT "1"

1 Plugs and Seals

0
1
2
3
4
5
6
7
 –
 8
9
10

DIGIT "2-3"

Plug and Seal Quick Coupling Series. Refer to the table "Hydraulic Quick Coupling Series".

0
1
2
3
4
5
6
7
 –
 8
9
10

DIGIT "4"

The number stated in this position indicates the Metal or Cap/Plug material:

- 0 Absence
- 1 STEEL
- 2 AISI 316
- 3 AISI 303
- 4 BRASS
- 5 ALUMINIUM
- A PE (polyethylene)
- B PVC
- C PA (polyamide)
- D POM (acetalic resin)

0
1
2
3
4
5
6
7
 –
 8
9
10

DIGIT "5"

The number stated in this position indicates the Seals material:

- 0 Absence
- 1 NBR (nitrile)
- 2 HNBR
- 3 FKM (viton, FPM)
- 4 CR (neoprene)
- 5 EPDM
- 6 FPM (Kalrez)
- 7 PTFE
- 8 VMQ (silicone rubber)
- 9 AU (polyurethane)

0
1
2
3
4
5
6
7
 –
 8
9
10

DIGIT "6"

The number stated in this position indicate the usage type

- 0 Simple Cap/Plug
- 1 EcoCap (with Oil Recycle)
- 2 Automatic Cap
- 3 Seal
- 4 Parking

0
1
2
3
4
5
6
7
 –
 8
9
10

PART NUMBERING SYSTEM

PLUG/SEAL (HYDRAULIC QUICK COUPLING)

DIGIT "7"

The numbers stated in this position indicate colour:

N	Not specified or natural
R	Red
B	Blue
Y	Yellow
G	Green
K	Black
W	Brown
H	White
O	Orange
E	Grey

0 1 2 3 4 5 6 7 – 8 9 10

DIGIT "8-9"

The numbers stated in this position indicate the quick coupling size. The size designation corresponds to the nominal inside diameter of the hose recommended for use with coupling (see ISO 4397)

0 1 2 3 4 5 6 7 – 8 9 10

DIGIT "10"

Free digit for version or other

0 1 2 3 4 5 6 7 – 8 9 10

PART NUMBERING SYSTEM

HYDRAULICS CHECK VALVES - HYDRAULIC QUICK COUPLINGS

0 1 2 3 4 5 6 7 8 9 10 – 11 12 – 13 14 15

Root

DIGIT "0" 0 1 2 3 4 5 6 7 8 9 10 – 11 12 – 13 14 15
Q Quick Coupling

DIGIT "1" 0 1 2 3 4 5 6 7 8 9 10 – 11 12 – 13 14 15
2 Check valves

DIGIT "2" 0 1 2 3 4 5 6 7 8 9 10 – 11 12 – 13 14 15
Check valves Series:
A Standard
B Compact

DIGIT "3" 0 1 2 3 4 5 6 7 8 9 10 – 11 12 – 13 14 15
Termination ends gender:
1 male male
2 female female
3 male female
4 female male

DIGIT "4" 0 1 2 3 4 5 6 7 8 9 10 – 11 12 – 13 14 15
The number stated in this position indicates the material:
1 STEEL
2 AISI 316
3 AISI 303
4 BRASS
5 ALUMINIUM

DIGIT "5" 0 1 2 3 4 5 6 7 8 9 10 – 11 12 – 13 14 15
The number stated in this position indicates the seals material:
0 Absence
1 NBR (nitrile)
2 HNBR
3 FKM (viton, FPM)
4 CR (neoprene)
5 EPDM
6 FFPM (Kalrez)
7 PTFE
8 VMQ (silicone rubber)
9 AU (polyurethane)

DIGIT "6"- "7" 0 1 2 3 4 5 6 7 8 9 10 – 11 12 – 13 14 15
The numbers stated in this positions indicate the **input** end configuration according to the "Termination Ends Type" table.

DIGIT "8"- "9" 0 1 2 3 4 5 6 7 8 9 10 – 11 12 – 13 14 15
The numbers stated in this positions indicate the **output** end configuration according to the "Termination Ends Type" table.

PART NUMBERING SYSTEM

HYDRAULICS CHECK VALVES - HYDRAULIC QUICK COUPLINGS

DIGIT "10"

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ – ⑪ ⑫ – ⑬ ⑭ ⑮

A letter stated in this position identifies the valve's crack pressure

A	0,35 bar	(5,1 psi)
B	0,10 bar	(1,5 psi)
C	0,20 bar	(2,9 psi)
D	0,50 bar	(7,3 psi)
E	1,00 bar	(14,5 psi)
F	1,50 bar	(21,8 psi)
G	2,00 bar	(29,0 psi)
H	2,50 bar	(36,3 psi)
J	3,00 bar	(43,5 psi)
K	3,50 bar	(50,8 psi)
L	4,00 bar	(58,0 psi)
M	4,50 bar	(65,3 psi)
N	5,00 bar	(72,5 psi)
P	6,00 bar	(87,0 psi)
Q	7,00 bar	(101,5 psi)
R	8,00 bar	(116,0 psi)
S	9,00 bar	(130,5 psi)
T	10,00 bar	(145,0 psi)

DIGIT "11"-12"

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ – ⑪ ⑫ – ⑬ ⑭ ⑮

Input termination end size

DIGIT "13"-14"

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ – ⑪ ⑫ – ⑬ ⑭ ⑮

Output termination end size

DIGIT "15"

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ – ⑪ ⑫ – ⑬ ⑭ ⑮

Free digit for other characteristics (narrows)

PART NUMBERING SYSTEM

HYDRAULICS QUICK COUPLING TAIL

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

Root

DIGIT "0"

Q Quick Coupling

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

DIGIT "1"

3 Q.Tail

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

DIGIT "2-3"

Quick Coupling series, according to "Hydraulics Quick coupling series" table.

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

DIGIT "4"

The number stated in this position indicates the material:

- 1 STEEL
- 2 AISI 316
- 3 AISI 303
- 4 BRASS
- 5 ALUMINIUM

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

DIGIT "5"

The number stated in this position indicates the seals material:

- 0 Absence
- 1 NBR (nitrile)
- 2 HNBR
- 3 FKM (viton, FPM)
- 4 CR (neoprene)
- 5 EPDM
- 6 FFPM (Kalrez)
- 7 PTFE
- 8 VMQ (silicone rubber)
- 9 AU (polyurethane)

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

DIGIT "6"- "7"

The letter stated in this position indicates the Insert type.

MF Multifit Type

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

DIGIT "8"

The number stated in this position indicates the Insert angle:

- 1 Straight

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

DIGIT "9"

A letter stated in this position identifies a customized version.

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

DIGIT "10"- "11"

The numbers stated in this position indicate the Quick Coupling size.

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

DIGIT "12"- "13"

The numbers stated in this position indicate the Insert size.

0 1 2 3 4 5 6 7 8 9 – 10 11 – 12 13

PART NUMBERING SYSTEM

HYDRAULICS QUICK COUPLING SERIES

SERIES	PLUG & SEALS SERIES	DESCRIPTION	
01	A0	Male according to ISO 7241-1 standards, series A	Free flow
02		Male according to ISO 7241-1 standards, series A	Poppet valve
03		Male according to ISO 7241-1 standards, series A	Ball valve
04		Male according to ISO 7241-1 standards, series A	Poppet valve, special guidevalve
05		Male according to ISO 7241-1 standards, series A	Ball valve, special guidevalve
06		Male according to ISO 7241-1 standards, series A	Connectable under pressure
07	A1	Female according to ISO 7241-1 standards, series A	Free flow
08		Female according to ISO 7241-1 standards, series A	One-way release, poppet valve
09		Female according to ISO 7241-1 standards, series A	One-way release, ball valve
10		Female according to ISO 7241-1 standards, series A	One-way release, connectable under pressure
11		Female according to ISO 7241-1 standards, series A	One-way release, connectable with male under pressure
12		Female according to ISO 7241-1 standards, series A	One-way release, connectable with both parts under pressure
13		Female according to ISO 7241-1 standards, series A	Two-ways release, poppet valve
14		Female according to ISO 7241-1 standards, series A	Two-ways release, ball valve
15		Female according to ISO 7241-1 standards, series A	Two-ways release, connectable under pressure
16		Female according to ISO 7241-1 standards, series A	Two-ways release, connectable with male under pressure
17		Female according to ISO 7241-1 standards, series A	Two-ways release, connectable with both parts under pressure
18		Female according to ISO 7241-1 standards, series A	Rigid, two-ways release, connectable with male under pressure
19		Female according to ISO 7241-1 standards, series A	Rigid, two-ways release, connectable with both parts under pressure
20	A2	Male according to ISO 7241-1 standards, series B	Free flow
21		Male according to ISO 7241-1 standards, series B	Poppet valve
22		Male according to ISO 7241-1 standards, series B	Ball valve
23	A3	Female according to ISO 7241-1 standards, series B	Free flow
24		Female according to ISO 7241-1 standards, series B	One-way release, poppet valve
25		Female according to ISO 7241-1 standards, series B	One-way release, ball valve
26		Female according to ISO 7241-1 standards, series B	Safety sleeve, poppet valve
27		Female according to ISO 7241-1 standards, series B	Safety sleeve, ball valve
28	A4	Male standard series	Free flow
29		Male standard series	Poppet valve
30		Male standard series	Ball valve
31	A5	Female standard series	Free flow
32		Female standard series	One-way release, poppet valve
33		Female standard series	One-way release, ball valve
34		Female standard series	Safety sleeve, poppet valve
35		Female standard series	Safety sleeve, ball valve
39	A8	Flat face male according to ISO 16028	Connectable under pressure
40		Flat face male according to ISO 16028	
41	A9	Flat face female according to ISO 16028	With safety sleeve
42		Flat face female according to ISO 16028	Without safety sleeve
45	AC	Male for diagnostic purpose according to ISO 15171	
46	AD	Female for diagnostic purpose according to ISO 15171	
47	AE	Male for hydraulic braking circuit according to ISO 5676	
48	AF	Female for hydraulic braking circuit according to ISO 5676	
49	AG	Screw type male for hydraulic braking circuit	
50	AH	Screw type female for hydraulic braking circuit	
51	AI	Screw type male for german market	
52	AJ	Screw type female for german market	
53	AK	Screw type male for very high pressure	
54	AL	Screw type female for very high pressure	
55	AM	Screw type male for hydraulic cylinder	

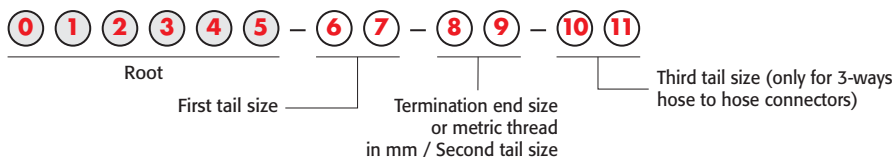
PART NUMBERING SYSTEM

HYDRAULICS QUICK COUPLING SERIES

SERIES	PLUG & SEALS SERIES	DESCRIPTION	
56	AN	Screw type female for hydraulic cylinder	
57	AP	Screw type male for truck	
58	AQ	Screw type female for truck	
61	AI	Screw type male for german market	Heavy duty
62	AJ	Screw type female for german market	Heavy duty

PART NUMBERING SYSTEM

TWO PIECES REFRI FITTINGS



DIGIT "0"

C Always



DIGIT "1"

- 1 Male or "Hose to hose" Connectors type Star-Crimp
- 2 Female or Flange type Star-Crimp
- 3 Male or "Hose to hose" Connectors type Frigoclic
- 4 Female or Flange type Frigoclic



DIGIT "2-3"

The numbers stated in these positions refer to the termination end or to the second tail. For the coding, see table "Termination Ends Type".



DIGIT "4"

This digit specifies the bending angle or the configuration

- 1 Straight
- 4 45° Swept
- 8 Compact type
- 9 90° Swept
- H 3-ways connector with "h" configuration
- T 3-ways connector with "T" configuration
- Y 3-ways connector with "Y" configuration



DIGIT "5"

- 0 No charge valve
- 2 1/4" SAE charge valve (thread 7/16"-20-UNF)
- 5 High Pressure charge valve
- 6 Low Pressure charge valve



DIGIT "6-7"

These digits specify the first tail size



DIGIT "8-9"

These digits specify the termination end size or the second tail size



DIGIT "10-11"

These digits specify the third tail size (only for 3-ways hose to hose connectors)



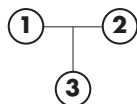
PART NUMBERING SYSTEM

TWO PIECES REFRI FITTINGS

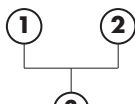
RULES FOR THE SIZE INDICATION IN THE HOSE TO HOSE CONNECTORS

In the double connectors, when the tails are part of the same family, the first size is the smallest. If the tails have the same size, this is repeated two times.

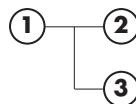
In the 3-ways connectors, tails in position "1" and "2" must be part of the same family. All the sizes are indicated following this order:



"T"
configuration

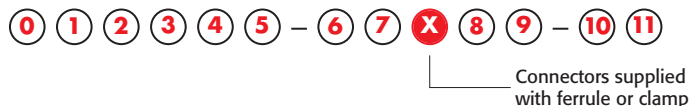


"Y"
configuration



"h"
configuration

CONNECTORS SUPPLIED WITH FERRULE OR CLAMP

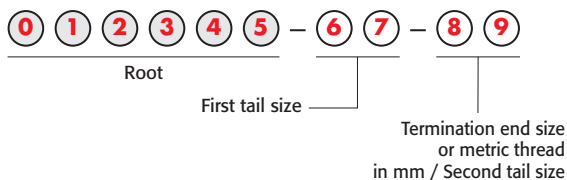


For connectors supplied with ferrule or clamp, the second dash is replaced by a letter according to following specifications.

A	Ferrule type C00700
C	Ferrule type C00300
D	Ferrule type C00750
R	Clamp type C01000
T	Clamp type C01050

PART NUMBERING SYSTEM

REUSABLE REFRI FITTINGS



DIGIT "0"

K Always



DIGIT "1"

3 Male or "Hose to hose" Star-Fit Connectors
4 Female or Flange Star-Fit



DIGIT "2-3"

The numbers stated in these positions refer to the termination end or to the second tail.
For the coding, see table "Termination Ends Type".



DIGIT "4"

This digit specifies the bending angle or the configuration.

1 Straight
4 45° Swept
8 Compact type
9 90° Swept



DIGIT "5"

0 No charge valve
2 1/4" SAE charge valve (thread 7/16"-20-UNF)
5 High Pressure charge valve
6 Low Pressure charge valve



DIGIT "6-7"

These digits specify first tail size



DIGIT "8-9"

These digits specify the termination end size or the second tail size



RULES FOR THE SIZE INDICATION IN THE HOSE TO HOSE CONNECTORS

In the double connectors, when the tails are part of the same family, the first size is the smallest. If the tails have the same size, this is repeated two times.

CONNECTORS SUPPLIED WITH FERRULE OR CLAMP

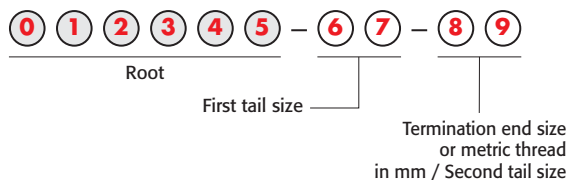


For connectors supplied with ferrule, the second dash is replaced by a letter according to following specifications:

B Ferrule type K00400

PART NUMBERING SYSTEM

ONE PIECE REFRI FITTINGS



DIGIT "0"

OPC Always



DIGIT "1"

- 1 Male or "Hose to hose" Fast-Crimp Connectors obtained by deformation
- 2 Fast-Crimp Female or Flange obtained by deformation
- 3 Male or "Hose to hose" Fast-Crimp Connectors obtained by brazing
- 4 Fast-Crimp Female or Flange obtained by brazing



DIGIT "2-3"

The numbers stated in these positions refer to the termination end or to the second tail. For the coding, see table "Termination Ends Type".



DIGIT "4"

This digit specifies the bending angle or the configuration.

- 1 Straight
- 4 45° Swept
- 8 Compact type
- 9 90° Swept



DIGIT "5"

- 0 No charge valve
- 5 High Pressure charge valve
- 6 Low Pressure charge valve



DIGIT "6-7"

These digits specify first tail size



DIGIT "8-9"

These digits specify the termination end size or the second tail size



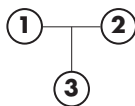
PART NUMBERING SYSTEM

ONE PIECE REFRI FITTINGS

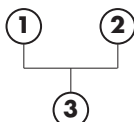
RULES FOR THE SIZE INDICATION IN THE HOSE TO HOSE CONNECTORS

In the double connectors, when the tails are part of the same family, the first size is the smallest. If the tails have the same size, this is repeated two times.

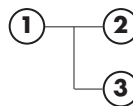
In the 3-ways connectors, tails in position "1" and "2" must be part of the same family. All the sizes are indicated following this order:



"T"
configuration



"Y"
configuration



"h"
configuration

PART NUMBERING SYSTEM

STAPLES



DIGIT "0"

J Accessories



DIGIT "1"

L Staples



DIGIT "2"- "3"

These digit identify the Termination End of the family to whome staples are referred.
See table "Termination Ends"



DIGIT "4"

This digit specifies the material used

0 Standard

1 Stainless



DIGIT "5"

This digit specifies the superficial

0 Standard

1 Zinc Plated

2 Spring Steel Black Phosphate



DIGIT "6"

The number stated in this position indicate the section's shape

S Standard

T Flat top

F Flat

D Form "D"



DIGIT "7"

The number stated in this position indicate the length

S Standard

L Long



DIGIT "8"- "9"

The number stated in this position indicate the nominal bore dash size



PART NUMBERING SYSTEM

RING/SEALS



Root

DIGIT "0"

J Letter always means Accessories



DIGIT "1"

O Letter always means Rings



DIGIT "2"-"3"

The numbers stated in these positions indicate the product, referring to the following list

- 04 O'ring for Staple Lock
- 12 Bonded seal ring
- 15 Support plastic ring (open ring)
- 23 O'ring for Super Staple Lock



DIGIT "4"-"5"

Number stated in these positions indicates the external ring diameter



DIGIT "6"-"7"

Number stated in these positions indicates the external ring diameter



DIGIT "8"-"9"

Number stated in these positions indicates the axial thickness



PART NUMBERING SYSTEM

VALVES

① ② ③ ④ ⑤ ⑥ ⑦ – ⑧ ⑨ – ⑩ ⑪

Root

DIGIT "0 1"

AV Means always Valves

① ② ③ ④ ⑤ ⑥ ⑦ – ⑧ ⑨ – ⑩ ⑪

DIGIT "2 3"

These digits identify the termination end (see table Termination End)

In case of termination ends differ only in terms of gender, indicate male termination (except for female "Swivel" version)

① ② ③ ④ ⑤ ⑥ ⑦ – ⑧ ⑨ – ⑩ ⑪

DIGIT "4"

Specifies Design, shape, pattern, valve system...

A 2 ways Cubic Ball Valve

D 2 ways Cylindrical Ball Valve

① ② ③ ④ ⑤ ⑥ ⑦ – ⑧ ⑨ – ⑩ ⑪

DIGIT "5"

Gender

M Always Male

F Always Female

B Male - Female

① ② ③ ④ ⑤ ⑥ ⑦ – ⑧ ⑨ – ⑩ ⑪

DIGIT "6"

The letter in this digit identify the handle type

0 No handle

1 Single Handle

L Single Long Handle

X Single Extra Long Handle

P Single Pad Lock Handle

S Single Straight

2 Double Handle

3 Hexagon Handle

5 Safety Handle

6 Safety Pad Lock Handle

① ② ③ ④ ⑤ ⑥ ⑦ – ⑧ ⑨ – ⑩ ⑪

DIGIT "7"

The letter in this digit identify the handle color or material (if not colored)

N Natural

R Red

W White

G Green

B Blue

O Orange

① ② ③ ④ ⑤ ⑥ ⑦ – ⑧ ⑨ – ⑩ ⑪

PART NUMBERING SYSTEM

VALVES

DIGIT "8 9 10 11"



- The numbers stated in these positions indicate the ends' size.
- When male and female ends are present, the male is always the first end.
- When all the ends are male or female, one end takes priority respect to the other one following the tables "Priority of the Ends".
- When ends are part of the same family, the first size is the smallest.
- When ends have the same size, the second size is omitted

PART NUMBERING SYSTEM

PROTECTIONS

0 1 2 3 4 5 6 7 8 9 10 11 12 13

Root

DIGIT "0"

"J" letter always means Accessories

0 1 2 3 4 5 6 7 8 9 10 11 12 13

DIGIT "1"

"P" letter always means Protection

0 1 2 3 4 5 6 7 8 9 10 11 12 13

DIGIT "2"

The number stated in this position indicates the protection type

- 1 Spring
- 2 Sleeve
- 3 Clinch

0 1 2 3 4 5 6 7 8 9 10 11 12 13

DIGIT "3"

The number stated in this position indicates the material

- 1 Polyethylene
- 2 Polyamide
- 3 Polyester
- 4 Silicone

0 1 2 3 4 5 6 7 8 9 10 11 12 13

DIGIT "4"

The letter stated in this position indicates the color

- B Black
- Y Yellow
- A Orange

0 1 2 3 4 5 6 7 8 9 10 11 12 13

DIGIT "5-6"

The numbers stated in these positions indicate the product family

- 01 Protection Spring
- 02 Mining Protection Spring
- 03 HT Protection Spring
- 04 Light Protection Spring
- 05 Fire Sleeve
- 06 Textile Sleeve
- 10 Clinch

0 1 2 3 4 5 6 7 8 9 10 11 12 13

DIGIT "7-8-9"

The numbers stated in these positions indicate the inside diameter in mm

0 1 2 3 4 5 6 7 8 9 10 11 12 13

DIGIT "10-11-12-13"

These digits define marking technology and package type

0 1 2 3 4 5 6 7 8 9 10 11 12 13